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## ABSTRACT

This document describes the formulation of academic assessment at Nassau Community College (NCC) (New York), presenting methods that can help faculty implement classroom assessment in the courses they teach. Section 1, the introduction, discusses assessment from philosophical and historical perspectives. Section 2 presents the five steps of goals-based assessment: (1) teaching goals; (2) outcome behaviors; (3) assessment measurements; (4) evaluating measurement results; and (5) formulating modifications. Section 3 describes the campus implementation process and the work of classroom faculty and top administrators. Section 4 is the "Classroom Assessment User's Guide," and it outlines the five goals-based assessment steps in detail. It also presents matrices for teacher use, including one for standard language and phrases, allied health sciences, communications, and mathematics. Finally, Section 5 provides a resource guide for the teacher, with a teaching goals inventory, the outcome goals of general education, and classroom assessment techniques. (JA)

**NASSAU COMMUNITY COLLEGE****CONCEPTS & PROCEDURES  
FOR  
ACADEMIC ASSESSMENT**

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A manual prepared for the faculty of NCC  
To aid in their quest to discover ways to  
Help students learn more effectively  
Through disciplined inquiries into teaching  
And learning in their classrooms.

**ASSESSMENT COMMITTEE  
OF THE  
ACADEMIC SENATE**

*February 1999*

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# P R E F A C E

## ***PURPOSE AND ORGANIZATION OF THIS MANUAL***

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The ultimate goal of assessment is to engage faculty in systematic efforts to maximize students' learning and, thereby, the educational excellence of the institution. This is not a goal that can be achieved easily or quickly. Yet it is the single goal that best captures what it is that faculty seek to do on a daily basis by helping students obtain the knowledge and skills required for meaningful lives and rewarding careers. In this regard, the College believes that improving student learning is not limited to the ability of the professor to clearly communicate content material. It also involves the ability of faculty to assess student comprehension and application of the content material, to gauge the effectiveness of their own methods and the methods of their students, and to develop more successful methodologies when necessary.

Effective teaching has always depended on establishing clear goals for student learning, devising ways to determine the extent to which students are achieving those goals, and using the results to modify teaching techniques and improve student learning. To the extent that faculty have always done these things, assessment should not be seen as an added responsibility beyond teaching, but as a central part of faculty's instructional mission. The only thing different about assessment is that it is intended to be *systematic*—to bring the assessment activities of individual faculty members into a common framework for the sharing of conclusions about how well students are learning and how best to teach them in the individual classes they take. Assessment is also meant to be *comprehensive*—to ensure that the dialogue of assessment results in a well coordinated, integrated body of learning across the different classes students take as part of their total academic program.

Nevertheless, with or without assessment, faculty are deeply convinced that the learning they desire for their students is generally taking place through their teaching. The task of assessment is to document and increase the reality of that hypothesis by defining what that learning is; observing its occurrence where and when it is taking place; and determining how to maximize it through modifications of the teacher and the learner. The formalization of assessment to include systematic approaches for faculty to accomplish these tasks in the courses they teach is a venture the College believes will strengthen significantly its ability to achieve and document educational excellence.

The basic focus involved in the formulation of academic assessment described in this work — that of classroom assessment — has developed from the accountability and improvement mandates confronting institution's of higher education and from faculty's desire to enhance the teaching and learning process. In examining the extent to which these goals can coexist, the College has concluded that:

- assessment, unlike other forms of evaluation, is expected to be designed with its primary focus on increasing the effectiveness of instruction and maximizing students' learning, rather than the performance of an individual faculty member;
- assessment, when conducted in a manner that provides for the systematic examination, analysis and improvement of teaching and learning, in-and-of-itself provides the basic accountability sought from the enterprise;
- to achieve its focus on teaching and learning, assessment is best conducted close to the scene of the activity under study — in the classroom, by the people who control the activity being studied — the classroom professor.

Also underlying the College's focus on the classroom is a larger expectation for assessment in which the College seeks to create a genuine climate for serious and systematic inquiries into teaching and learning by faculty using their classrooms as the theatre for pedagogical research. This vision, acknowledged in the report of the Carnegie Commission for the Advancement of Teaching: Scholarship Reconsidered: Priorities of the Professoriate (Boyer, 1994), promises opportunities for the College to make productive contributions to pedagogical knowledge through the scholarship of continuing study and research by its faculty and, in so doing, engage aspirations for individual and institutional excellence.

Effective classroom assessment is no doubt being practiced and utilized for these and other purposes on many campuses across the United States. Unfortunately, most of these experiments go unpublished outside the campus of record, and those that are published appear to be distributed across the literature of specific academic disciplines. This makes it difficult for classroom faculty to find tested approaches to assess their teaching and the learning of their students or to find generally accepted principles of good practice to guide their own efforts to develop assessment strategies. The purpose of this manual is to help reverse this absence of information by presenting methods and practices that can help faculty get started in implementing classroom assessment in the courses they teach.

This manual focuses first on the nature of classroom assessment and a conceptual paradigm for conducting a classroom assessment inquiry - what the steps are, and how they are supposed to work. The basic tools for carrying out those steps - the Assessment Matrix, the Teaching Goals Inventory, and various Classroom Assessment Techniques for measuring student learning - are then introduced. The application of these tools to various types of courses is also documented through a series of examples formatted for quick reference as a User's Guide. Finally, these methodologies are set into an operational campus process by which the College has begun to implement academic assessment through the participation of its students, faculty and administration.

# SECTION I

## **INTRODUCTION : PHILOSOPHICAL AND HISTORICAL PERSPECTIVES**

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### **THE VISION OF ASSESSMENT AT NCC**

The reasons for assessment in higher education are as varied as the motives of its participants. Two principal concerns, one external and one internal, are clearly visible in driving the development of assessment at Nassau Community College. One concern stems from external accountability to the state and society for the funds that support the College. The other reflects the internal responsibility of the College to enhance student learning and to improve institutional effectiveness. The College believes that the sometimes-fragile combination of these two concerns can, in fact, gain sufficient commitment and participation to demonstrably enhance student development and institutional quality. By operationalizing assessment for these purposes, faculty can be inspired to use the process to transform their teaching and the learning of their students and, in that very process, achieve the results sought in the numerous quality assurance mandates that are directed to institutions of higher education.

The traditional view of quality in higher education is one that is based on reputation, resources, and selectivity. According to this view, the quality of colleges or universities depends on their prestige rather than on their performance—prestige that is often based on the quality of the students they admit rather than on what they learn while on campus. This model simply assumes as “conventional wisdom” that the greater the resources or the “inputs”, the better the performance or the products of a college or university.

Recently, both society and scholars have come to raise serious questions as to the validity of this notion of quality, based on the negative results of several national studies concerning the quality of American undergraduate education. Increasingly, public officials now argue, in the name of accountability, that the quality of educational institutions should be judged on their *outcomes* rather than on their incomes. And more educational experts are concluding that the true test of institutional quality should be its contribution, or “value added”, to the intellectual and personal development of its students from admission to graduation. Both groups now agree that the quality of a college or university should be judged not by its capacity to attract the brightest students or to gain the most resources, but by its ability to assist its students to become the best they are capable of achieving.

Nassau Community College embraced this principle of quality by focusing its framework for assessing student learning and development on the *classroom*. The



College believes that involving all faculty in assessment within the venue of the courses they teach provides the most direct opportunities for faculty to use assessment to maximize the effectiveness of their teaching and its impact on the learning of students. The promise of this approach to assessment lies in its potential to fulfill two transformational goals for institutions of higher education:

- to motivate the attainment of institutional excellence based upon performance, rather than prestige, and results, rather than resources; and
- to inspire faculty scholarship through opportunities for disciplined inquiry into teaching and learning and to renew the sense of community among faculty by uniting them under the common cause of attaining institutional excellence.

Like the redefinition of institutional quality underlying the first goal, the second of these goals is also the result of much discussion in higher education, a discussion about the proper definition of scholarship and the professional identity of faculty on college campuses. The implicit assumption that research and publication in the disciplines are the most appropriate measures of professional achievement has been increasingly called into question since the 1980's. Even among the great universities whose missions are in large part identified with advancing the frontiers of knowledge through disciplinary research, there is increasing recognition, support and encouragement of faculty endeavors that study *teaching and learning*.

Most colleges and universities are, in fact, teaching institutions, and most faculty—70% according to a periodic survey published in the *Chronicles of Higher Education*—are more interested in teaching than in discipline research. Assessment, now an acknowledged activity in the mission of higher education, provides rich opportunities for empirical inquiries into teaching and learning by faculty in the observational settings of their own classrooms. The College believes this activity, termed *classroom research*, will provide the way for faculty to expand their professional identities and enhance their professional careers through scholarship of the kind that advances the understanding of learning in their particular academic fields and the learning achieved through the total college experience.

Assessment used for these purposes clearly offers the opportunity for institutions to regain the sense of community that struggles to exist on the college campuses of today. The divisions imposed by disciplines and subdisciplines and the resulting complexity of the organizational structures of college campuses have served to diminish the discourse that is the hallmark of the collegial enterprise. The faculty of today has fewer shared interests with little to discuss between and often within their respective departments, with instruction becoming a more isolated activity rather than a collective endeavor. The forums provided by campus governance cannot fill this need for their debates too often reflect concerns brought about by faculty jurisdictions and departmental self-interests, rather than the critical issues that relate to teaching and learning. The College believes that assessment can and should be used to transform



institutions, such as ours, into more vibrant communities in which faculty scholarship and discourse attempt to resolve the great questions of what students should know, what they should be able to do and how best to achieve those expectations.

The shared purpose derived in seeking excellence and scholarship through assessment is a vision that this college also believes will attract the commitment of faculty, for it promises to enrich their professional lives as both teachers and scholars and raise the stature of the institution in which they work. But faculty's commitment to this vision will not by itself achieve the desired ends. Assessment must also be operationalized through a framework that provides effective strategies and well-defined tasks through which faculty can work to accomplish their aims and goals. At the same time, assessment requires systematic methods of inquiry if it is to produce interpretable results that inform the questions of teaching and learning. The definition and communication of these needed operational elements of assessment represents the principal purpose and scope of this written work. To communicate the College's system of assessment as a source of enrichment and inspiration is also its challenge.

### THE EVOLUTION OF ASSESSMENT AT NCC

The development of the College's current vision of assessment can be traced to campus initiatives begun more than a decade ago. The first of these was undertaken in response to a 1987 policy directive to all SUNY campuses calling for the formulation and submission of individual campus plans to assess student learning and development in four critical areas of the college curriculum: *Basic Skills, General Education, Specialized (Major), Personal & Social Development*.

The College's 1989 response to the SUNY mandate outlined the progress of its thirty academic departments in developing individual assessment plans to address the four required areas and the creation of a committee of the Academic Senate to monitor assessment activities across the College. The response to the College's proposed assessment plan from then Provost Joseph Burke cited the need for the College to develop *specific, systematic and uniform procedures* for assessing learning across its varied academic programs.

The Assessment Committee of the Academic Senate (ASAC) and the College Administration responded to this need by introducing a uniform framework for assessing student learning consisting of five sequential steps:

- (1) Defining Goals
- (2) Identifying Behaviors
- (3) Designing Measuring Instruments
- (4) Evaluating Measurement Results
- (5) Developing Response

The columnar reporting format utilized in the model gave it the name *GAFID, Goals Assessment Format for Individual Departments*. Over the next several years GAFID became the object of various attempts by the ASAC to implement assessment on a campus-wide basis. But, by 1994, the failure of SUNY to sustain its original mandate left assessment without a defined campus purpose and the process to lapse into inactivity.

Superseding the SUNY initiative, however, was still the persistence of outcomes assessment as a requirement for institutional accreditation. By 1994, this requirement had become the object of increased clarification and demands by the Commission on Higher Education of the Middle States Association, the College's regional accrediting body.

As a Middle States institution, continued accreditation of NCC requires that it demonstrate a viable and ongoing program of outcomes assessment. The Commission cites the necessity of this requirement in two of the sixteen standards for accreditation defined in its primary policy document, Characteristics of Excellence in Higher Education - Standards for Accreditation (1994):

- ***On-going Institutional Self-study***

"One of the primary indications of the effectiveness of faculty, administration and governing boards is the skill with which they raise questions about institutional effectiveness, seek answers, and significantly improve procedures in light of their findings. ... The basic process begins with a thorough review of the institution's programs, curricula, courses and other instructional activities." (pp. 16-17)

- ***Effective Outcomes Assessment***

"The approaches ... should assess the outcomes at all levels, linking course goals to program goals and both to institutional goals. ... The plans should attempt to determine the extent and quality of student learning. ... Especially significant are institutional studies which provide insights into effective teaching and the role of campus climate in promoting student learning and development." (p. 17)

The specific expectations of the Commission concerning these two standards for accreditation are detailed in a separate policy document, Framework for Outcomes Assessment (1996) designed "... to assist colleges and universities meet the outcomes assessment requirements of the Commission on Higher Education..." (p. 1) and, with respect to teaching and learning, to "collect and analyze the assessment data required to judge the effectiveness of teaching and learning" (p. 3). Of all the quality assurance mandates, Framework provides the clearest definition of expectations concerning the assessment of teaching and learning in examining the effectiveness of institutions of higher education.

The need to operationalize a systematic assessment process was also stressed directly to the College in the Report to the Faculty, Administration, Trustees and Students of Nassau Community College by the evaluation team of the Middle States Association that visited the campus in 1994. The Team cited among its principal recommendations for needed improvements at the College:

- "The College has made a promising beginning in establishing a process for assessing outcomes with respect to general education, developmental and departmental courses. ... However, as indicated in the self-study, much needs to be done to fully implement the process." (p. 5)
- "... build upon this process so that there are appropriate systems for assessing program level processes and outcomes as well as overall student performance from both academic and nonacademic perspectives." (p. 6)

Final motivation for decisive action on the part of the College came in 1996 in the form of a policy initiative of the Board of Trustees of the State University of New York regarding SUNY Performance Reporting and Academic Mission Review (August 1996). The initiative calls for a new system of resource allocation geared toward *performance funding* by the State of New York, similar to the practice gradually being operationalized in other states. Its practice would allocate resources to colleges and universities on the basis of institutional performance in achieving desired learning outcomes using specific mechanisms for assessing such learning that involves both internal and external sources.

In response to the addition of Performance Funding to the growing list of higher education quality assurance mandates, the College took strategic measures to position itself to influence their eventual implementation. In 1996, a leadership initiative on the part of the college administration re-established the necessity of outcomes assessment as a needed component of college planning and initiated its redevelopment through one of three strategic themes adopted by the Planning Committee of the Academic Senate. Following that action, the Vice-President for Academic Affairs conducted a series of meetings with concerned organizational units to determine the direction of college actions to revitalize program review and academic assessment. It was agreed that academic assessment would focus on the analysis of student learning in individual courses, utilizing classroom measurements conducted by and coordinated between the faculty teaching a particular course. It was expected that course-level assessments would be documented in a manner that would anticipate the aggregation of results necessary to develop assessments of students' cumulative learning across programs called for in the various public accountability mandates directed to the College.

In a follow-up report to the Commission on Higher Education in September 1996, the College cited as evidence of its commitment to the principles underlying the recommendations of the 1994 Visiting Team the recent development of the three strategic planning themes. Included among those themes was the commitment to

develop "... systematic procedures to assess outcomes at all levels of institutional activity and their effectiveness in achieving the mission of the College." From this point, the College no longer questions whether it should be accountable for its outcomes, for in that matter it has little choice. Instead, it has chosen to develop for itself (and demonstrate to others) the manner in which that accountability can be operationalized in response to the legitimate expectations of both its external and internal publics. The College's approach to this challenge has been unique in redefining assessment not as a defensive activity but as an instrument to be used to enrich and inspire teaching, and in this way achieve quality assurance through the achievement of institutional excellence.

Today, faculty responsibility for the implementation, coordination and documentation of course-level assessment continues to reside in the ASAC, whose membership was reorganized and expanded to provide for the regular communication and monitoring of assessment activities across the College's 30 academic departments. Administrative responsibility for assessment is placed within the Office of Institutional Research (OIR), which devotes one half-time position exclusively to the work of assessment and the ASAC. That collateral responsibility for the day-to-day affairs of assessment appears to have worked well in achieving the operationalization of assessment that had eluded the College in the past. Currently, academic assessment receives a visible place in the activities of the Vice-President for Academic Affairs, the Dean of Instruction, the Assistant Dean of Academic Affairs for Institutional Research and the College's teaching faculty. A formal assessment plan is also now part of the required proposal materials submitted to the college-wide curriculum committee by academic departments for the adoption of new courses.

## SECTION II

### THE CONCEPTUAL FRAMEWORK OF ASSESSMENT

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*Outcomes assessment* is understood to involve the systematic examination and analysis of the results (outcomes) of an organization's activities conducted usually for the purpose of determining how to maximize the organization's effectiveness in achieving its desired outcomes. Assessment in this sense occurs in higher education within a variety of institutional processes, these forms of assessment differing primarily with respect to the particular range and types of outcomes examined. The outcomes can be as broad as those that characterize the mission of the institution as a whole, as in assessments of *Institutional Effectiveness* conducted to inform an institution's *Strategic Planning* efforts. They can also be as specific as the outcomes associated with a particular instructional strategy, as in the systematic *Classroom Assessments* of student learning conducted by teaching faculty to determine needed improvements of instruction. *Program Review*, yet another form of self examination in higher education, differs from these other forms of assessment by its distinctive focus on the cumulative outcomes associated with students' involvement in the *academic major*. In terms of specificity, therefore, the outcomes examined in program review are somewhere between those of institutional effectiveness assessments and classroom assessments.

Though distinct and separate in their levels of inquiry, these various forms of assessment do, of course, share the same fundamental purpose, which is to improve the effectiveness of the institution in achieving its desired outcomes. The distinctions projected by these processes lie simply in the particular kinds of outcomes they seek to maximize. Indeed, as institutions mature in their practice of assessment, it can be expected that formal linkages among the different assessment processes will develop to provide a visible framework to coordinate the institution's various assessment efforts. Given the current emphasis on institutional accountability described in the previous section, it is not surprising that such a unifying framework is best found in the institutional effectiveness component associated with the process of strategic planning.

#### COURSE-EMBEDDED ASSESSMENT

In this document, the term "assessment" is intended to mean *academic assessment*, which refers to a wide range of approaches used to evaluate educational effectiveness through direct observations of students' learning and development. Traditionally, academic assessments have involved the use of commercially available (norm-referenced) tests or locally developed (criterion-referenced) tests administered to large numbers of students to assess their cumulative learning. While such macro-level assessments have provided useful information to the faculty to guide curriculum revision



and to evaluate the effectiveness of specific academic programs, they are generally not designed to address questions that are meaningful and useful to individual classroom teachers. The results of such assessments tend to apply more to the structure of the curriculum or to the support practices of programs and departments than to teaching and learning in particular courses and classrooms.

Since the 1980s, a major component of academic assessment has come to include *course-embedded assessment*, which involves the systematic examination of what and how much students learn as a result of taking a particular course. The focus on individual courses has evolved from the realization that institutional assessments of the cumulative learning of students across the curriculum tend to attract the participation of relatively few faculty and, as a result, are rarely translated into changes at the classroom level. Ideally, course-embedded assessment involves teachers in the systematic observation of student learning in the courses they teach in ways that provide faculty with feedback about the effectiveness of their teaching, students with measures of their progress as learners, and the College with documentation about how well its most fundamental mission - effective teaching and learning - is being achieved.

To operationalize these ambitions, teachers define what it is they are trying to teach and have students learn in a particular instructional unit. They then make critical observations in the courses they teach of student behaviors that have resulted from that learning. Faculty then interpret the results of this feedback to arrive at conclusions as to how well students are learning and, where appropriate, to formulate a response that modifies what or how they teach and what or how students learn. Course-embedded assessment practiced in this way has come to be known as *classroom assessment*, and the systematic inquiries, when specifically designed by faculty to advance their knowledge of the teaching-learning interaction, is known as *classroom research*.

It is important for faculty to understand that classroom assessment is a formative rather than summative form of assessment. That is, its purpose is to improve how well students learn, not necessarily to provide a basis for evaluating or grading them and certainly not to provide a basis for evaluating the instructor. Its basic aim is to provide faculty with information on what, how much, and how-well students are learning so that faculty and students can devise ways to improve that learning and increase students' performance on graded evaluations. This formative approach to course-embedded assessment is dependent on three guidelines:

- that it be conducted by faculty in their own classrooms to address questions concerning the effectiveness of their own teaching in achieving desired goals for student learning;
- that faculty must make their teaching goals explicit and obtain systematic feedback to inform them of the extent to which the learning intended in those goals is being achieved;

- that students need to give and get feedback during the course of their learning to assess the nature and effectiveness of their own learning methods.

## **GOALS-BASED ASSESSMENT**

As noted above, classroom assessments that are to develop conclusions about better learning and more effective teaching need to be constructed around explicit teaching goals, faculty's definitions of what it is they want students to learn as a result of their teaching. In effect, teaching goals determine what it is that needs to be assessed and, from that determination, what methods of observation will be needed to collect the feedback that will reveal students' achievement of the teacher's goals. Classroom assessments constructed around explicit goals for students' learning constitute *goals based assessment*, the specific components of which are conceptualized in the following five-step paradigm:

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### **GOALS-BASED ASSESSMENT (GBA) PARADIGM**

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- (1) Defining teaching goals — what it is faculty are trying to teach in a particular lesson, unit or course.
  - (2) Identifying specific outcomes — behaviors/actions on the part of the learner that demonstrate that such learning has occurred.
  - (3) Developing measurements — strategies/techniques for collecting feedback data that evidence the extent to which intended learning is taking place.
  - (4) Evaluating measurement results — Analyzing and interpreting student feedback to determine the effectiveness with which teaching goals are being achieved.
  - (5) Formulating modifications — actions taken in response to feedback for improving the achievement of teaching goals.
- 

The GBA Paradigm conceptualizes the logical progression of steps by which data about student learning is targeted (steps 1-2) and collected by classroom faculty (step 3) in order to monitor how and how well teaching goals are being accomplished in a particular class. The specific purpose of this activity is to uncover trends and causes (step 4) that can provide a systematic basis for the formulation and testing of instructional responses (step 5) to improve the impact of teaching on students' learning. Through the application of such a framework for observing students in the process of their learning classroom faculty can learn much about how students learn and, more specifically, how students respond to particular teaching approaches. The use of this information to help faculty refocus their teaching and students adjust their own methods



of learning is the approach by which classroom assessment seeks to improve educational quality.

In assessing the learning resulting from the variety of courses that students take, classroom assessments, as described above, will need to be communicated to other faculty for a variety of purposes. For curricular coherence, for example, when other faculty are involved in teaching the same course and share common teaching goals, there is a larger opportunity to improve the achievement of those goals through similar assessments across multiple sections of the course. Additionally, systematic classroom assessment is a form of research from which generalizations about teaching and learning are developed and shared through the scholarship and dialogue that occurs between faculty. Inevitably, there is also a need to document and communicate the procedures used for institutional assessment for accreditation and other accountability purposes.

A useful tool for summarizing and communicating the design, implementation and results of a GBA is provided by the *Assessment Matrix*, a kind of worksheet that can be used to communicate the definitions, decisions, and results that have been built into and have emerged from the five steps of the GBA paradigm. The following page contains a blank copy of the Assessment Matrix form, which can be reproduced for faculty use. Examples drawn from various academic disciplines that illustrate the completion of the Matrix are given in Section IV of this manual, the *Classroom Assessment User's Guide*. In effect, the Assessment Matrix is a summary of the *assessment plan* in terms of the teaching goals (column 1) and behavioral outcomes (column 2) to be assessed and the measurement strategies (column 3) devised by faculty to determine the occurrence of those outcomes. It also reports, in summary form, the *assessment results* in terms of faculty's evaluation of the measurement results (column 4) and the intended response with different teaching approaches and other course-related modifications (column 5).

## **THE FIVE STEPS OF GBA**

In the following, the five steps of the GBA paradigm are conceptually described: what they are, and how they are supposed to work in the conduct of classroom assessment. In Section III of this manual (Classroom Assessment User's Guide), these descriptions are detailed in more applied terms and illustrated with examples of classroom assessments drawn from various academic disciplines.

### **Step 1 – Teaching Goals**

In classroom assessment, faculty attempt to assess the effectiveness of teaching and learning while the learning is in-progress (formatively) in order to determine when results are below expectations, and what should be done to set matters back on course. In order for faculty to know, with some precision, what it is they should assess for this purpose, they must define explicitly what it is they expect students to learn from their

# ASSESSMENT MATRIX

COURSE : \_\_\_\_\_

Teaching Goal What it is faculty are trying to teach students in a particular lesson, unit or course.	Outcome Behaviors Observable behaviors or actions on the part of students that demonstrate that the learning intended in the teaching goal has occurred.	Measurements Design of strategies / techniques / instruments for collecting feedback data that evidence the extent to which the desired behaviors are demonstrated by students.	Evaluation Results of analyses and interpretations of the measurement data that determine the effectiveness with which the teaching goal is being achieved.	Modifications Recommended actions for improving the achievement of teaching goals that respond to the measurement evaluation.

teaching. Thus, effective assessment begins with clear goals and objectives that make explicit what faculty want students to know by the end of a particular instructional unit or course.

While the need for goal clarification appears obvious enough, for many faculty the task of accomplishing it may be less straightforward. In higher education, teaching goals are often implicit in what faculty are teaching in their classrooms and are not commonly the subject of explicit definitions, as opposed to the practices of primary and secondary education. Thus, faculty may find it difficult to articulate their specific instructional goals for particular classes, and even more difficult to relate some teaching goals, such as those of critical thinking and other non-subject matter goals, to deliberate instructional strategies conducted in their classrooms. The use of one of several generic inventories of instructional objectives, on which much published research has developed over the past thirty-five years, can greatly facilitate the process of goal clarification by faculty.

The most direct inventory-type instrument for defining instructional goals is the *Teaching Goals Inventory* (TGI) developed at the National Center for Research to Improve Post-secondary Teaching and Learning (NCRPTAL, 1990) by Cross and Fidler. The inventory consists of fifty-two generic teaching goals within the six broad areas of student learning identified in the accompanying table. Also shown for each cluster is the importance mean ( $\mu$ ), standard deviation ( $\sigma$ ), and the percentage (%) of the sample of 1837 community college faculty who were involved in the NCRPTAL validation study that rated the items in the cluster "essential" to the teaching of a particular target course. Clearly, higher-order thinking skills (Cluster I) and the development of discipline-specific knowledge and skills (Cluster III) are regarded by faculty as the most important goals of their classroom teaching.

**Importance Ratings for TGI Clusters  
Community College Faculty  
(N = 1,873)**

<i>Cluster</i>	<i>Type of Learning</i>	$\mu^{(1)}$	$\sigma^{(2)}$	% <sup>(3)</sup>
I	Higher-Order Thinking Skills	3.09	0.86	45
II	Basic Academic Skills	2.29	1.20	22
III	Discipline-Specific Knowledge and Skills	2.83	1.06	36
IV	Liberal Arts & Academic Values	2.02	1.29	18
V	Work & Career Preparation	2.50	1.00	20
VI	Personal Development	2.28	1.22	25

(1) Importance Mean of Cluster Items    (2) Cluster Standard Deviation    (3) % Rating Cluster items as "Essential"

A scorable, survey-version of the TGI is included in the *Resource Guide* (Section V) at the end of this manual. The application of the TGI to the formulation of teaching goals is illustrated in the *User's Guide* (Section IV), for several courses across various academic disciplines.

## Step 2 – Outcome Behaviors

After faculty members identify specific teaching goals that indicate what learning they wish to assess, they can better determine what kind of feedback to collect in their classrooms and devise ways to collect it. But, in many cases, there can be a wide gap between stating a general instructional goal — “teaching students to apply effective problem-solving skills in the context of basic problems in physics”, for example — and knowing *how* to assess that goal. The instructor might then ask: “What specific behavior or action on the part of students would demonstrate that they have mastered the learning intended in my teaching goal?”. In other words, what should students be able to do — what task should they be able to perform — that would indicate they accomplished the goal?

The association of a teaching goal concerning students' learning with a behavior, ability or action that students can be expected to demonstrate as an *outcome* of that learning is what needs to be extracted in step 2 of the GBA paradigm before a measurement can be devised (step 3). In effect, identifying a behavioral outcome for a teaching goal transforms the goal into an observable effect. This reduction is illustrated below for the previously cited teaching goal of developing problem-solving skills in a physics class.

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### *Example - Abstract Teaching Goal to Assessable Outcome*

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**Course :** FIRST-SEMESTER COLLEGE PHYSICS

**Abstract Goal :** Help students develop effective problem-solving skills

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**Teaching Goal :** Help students develop effective problem-solving skills by developing their ability to apply the logical progression of steps involved in the solution of basic force-acceleration problems in mechanics.

---

**Behavioral Outcomes :** Students should be able to apply the generic problem-solving method they have been taught as evidenced by the accuracy with which they can:

- Demonstrate the logical progression of steps involved in the problem-solving method in an assigned problem they can solve;
  - Determine when, where, and why they have become stuck in the application of the method to an assigned problem they cannot solve;
  - Determine what questions to ask themselves when they do become stuck in solving a problem.
-

As a first step, the physics instructor in this example selected TGI 3, "to help students develop effective problem-solving skills", as an essential goal that needed to be assessed. But the instructor also had to decide that the particular way students were being taught to "... develop effective problem-solving skills" was by "... developing their ability to apply the logical progression of steps involved in the solution of basic force-acceleration problems in mechanics". Through this reflection the instructor formulated the *course-specific teaching goal* that represents step (1) of the GBA paradigm. Then, in step (2) of the paradigm, the physics instructor identified specific assessable behaviors students would be expected to demonstrate as outcomes of the learning related to the teaching goal. In effect, it is the nature and focus of the questions concerning learner behaviors decided here that dictates the particular kind of assessment measurement technique that will be needed in step 3 of the GBA paradigm.

Step (2) of GBA, then, makes the process of assessment one of observing students in *action* to assess their learning. Underlying this approach are certain views about learning widely held by NCC faculty that emphasize active development of the learner:

- that learning involves the ability to make an action out of knowledge — using knowledge to think, judge, decide, discover, interact, or create; acquiring or storing knowledge is not enough; unless one can carry knowledge into acts of application, generalization, and experimentation, one's learning is incomplete;
- that educators' best means of judging how well a learner has developed expected abilities is to look at corresponding behavior — thinking behavior, judging behavior, decision behavior, inquiry behavior, or appreciating behavior, for instance; the purposefulness of human behavior presupposes a strong link between behavior and cognitive and affective processes.

Regarding these assumptions, there is ample experience among educators showing that learning increases, even in its serendipitous aspects, when learners know what they are setting out to learn (goals), understand what expectations they must meet (outcomes), and have a way of seeing what they have learned (assessment). When the college physics students cited earlier, for example, know that they will have to go beyond replicating the problems solved in their text and by their professor, that they will have to raise questions and test their own explanations in problem-solving, they are more apt to learn to do all of the above more meaningfully and effectively. Moreover, it is only out of that success that students develop the kind of assurance that enables them to recognize unsought-for insights when they come upon them. They are then beginning to experience the goal of knowledge isle. They are learning to discover!

### Step 3 – Assessment Measurements

The observational methods used in classroom assessments may vary considerably according to the nature of the course involved and the concerns of the faculty who teach it. Testing of students is often used to determine *what* students are learning and how to improve the achievement of future groups of students. Student reaction tasks are often designed to probe *how* students are learning and what can be altered at the time that learning is taking place. Instructor questionnaires are sometimes helpful in assessing the appropriateness of *learning expectations*, obtaining direct perceptions of the extent to which learning expectations have been achieved and determining the relationship of student achievement to specific instructional practices.

Deciding what kind of feedback to collect and what kind of measurement strategy can provide that feedback is the point where classroom assessment begins to take form as a classroom activity. The design or selection of a classroom assessment measurement by a teacher will, of course, be influenced by a number of practical factors, such as:

- the nature of the behavioral outcome that needs to be assessed;
- the type of feedback technique that seems most suited to the task and the class; and
- how the assessment activity is to be administered as part of the ongoing instructional activities.

But more fundamental to the teachers decision concerning the type of measurement strategy to be used is the question of what the teacher hopes to learn as a result of the assessment. If the purpose of the assessment is to find out *how much* a student knows (e.g., the student responded correctly to 80% of what was asked and, by reasonable implication, has learned 80% of what was taught), then some form of testing will probably do. In the case of the physics instructor, for example, a student's achievement with respect to problem solving might simply have been inferred by seeing how much of a given problem the student could solve on a test. If, on the other hand, the assessment is being conducted to determine *what a student can do* with what was learned (e.g., the student can perform this action successfully, but not that), then the techniques the teacher uses must provide a description (rather than a measurement) of ability. By judging a student's performance in expressing an ability against criteria (expected behaviors), assessment can reveal more than how much learning a student has achieved; it can reveal the nature, extent, and quality of what a student has learned and thus have a special power to serve the learner and the teacher in building future performance.

*Classroom Assessment Techniques (CATs)* are the developed techniques or instruments faculty use to obtain the feedback on how much and how well (and even how) students are learning what they are trying to teach. Each CAT is a specific procedure or activity that has been designed or adapted to assess the occurrence of



learner behaviors identified as outcomes of a particular teaching goal. Once the behaviors are formally identified (step 2 of the GBA paradigm), faculty can choose the particular measurement strategies needed to assess those behaviors in a formative way.

At their best, CATs are designed to inform the learner as well as the teacher and are focused to explicitly defined elements of subject matter. Some well-practiced CATs are described in Classroom Assessment Techniques: A Handbook for Faculty (Angelo and Cross, 1993) that are designed to address the following areas of student learning and development:

- I. Course-Related Knowledge and Skills
  - A. Knowledge, Recall, and Understanding
  - B. Skills in Analysis and Critical Thinking
  - C. Skill in Synthesis and Creative Thinking
  - D. Skill in Problem Solving
  - E. Skill in Application & Performance
- II. Learner Attitudes, Values, and Self-Awareness
  - A. Students' Awareness of Their Attitudes & Values
  - B. Students' Self-Awareness as Learners
  - C. Course-Related Learning/Study Skills, Strategies, & Behaviors
- III. Learner Reactions to Instruction
  - A. Learner Reactions to Teachers & Teaching
  - B. Learner Reactions to Class Activities, Assignments, & Materials

As a case in point, the teacher-devised measurement strategies to assess the three learner behaviors associated with the problem-solving goal of the first-semester college physics class will probably be variations of *Documented Problem Solutions*, a particular CAT that is well designed to accomplish what the instructor wants:

CAT # 21  
Documented Problem Solutions

Assesses (1) how students solve problems and (2) how well they understand their problem-solving methods. Student is prompted to record a brief explanation of each solution step as part of a problem-solving question. Analysis of these protocols provides direct feedback on effective problem-solving practices.



Although purely summative strategies could be used to assess *what* students' have achieved in relation to this teaching goal, the instructor will choose a CAT that also includes diagnostic feedback when there is a need to determine *how* students are responding to what they are taught. The information gleaned from this kind of measurement provides a more conclusive basis for modifications of the instructor's teaching to improve the achievement of students.

The *Resource Guide* (Section V) at the end of this manual contains a listing of fifty different CATs that can be used by faculty to conduct formative evaluations of the learning of students in their classrooms. They represent a system of well-practiced "feedback devices" among teaching practitioners that have been adapted by Cross and Angelo from a set of Classroom Assessment Techniques developed by NCRIPAL as part of the TGI Project. The CATs are listed by related goal clusters in the TGI so that instructors can locate the assessment techniques that are most related to their teaching goals. The list includes twenty-seven CATs for assessing course-related knowledge and skills, thirteen CATs for assessing students' course-related attitudes and values, self-awareness and learning strategies, and ten techniques to assess students' reactions to instruction.

Each CAT is described in Classroom Assessment Techniques: A Handbook for Faculty (Cross and Angelo, 1993). The handbook provides detailed information about each of the fifty CATs, including time investment, description, purpose, related teaching goals, suggestions for use, examples of use, directions for implementation, suggestions for data analysis, pros and cons, cautions and caveats, and related references and resources. Most CATs can be used summatively, as well as formatively, to gain supportive measures of students' achievement with respect to more focused areas of learning than can be accomplished through traditional classroom tests. But their greatest value is in providing faculty with a systematic basis to analyze the impact of their teaching and formulate responses to improve that impact.

#### **Step 4 – Evaluating Measurement Results**

Nearly all the CATs applied in step 3 of the GBA paradigm will generate data that can be analyzed and evaluated quantitatively, qualitatively, or by a combination of the two approaches. Given the formative nature of classroom assessment, approaches that combine numerical and qualitative observations are often the most useful. The nature of the analysis applied to the data collected through these assessment techniques will, of course, depend on the original purpose for assessing classroom learning in the first place. For example, assessing students' knowledge of a particular concept will definitely require different approaches to the analysis of data from assessing their reactions to a particular lesson.

Many of the skills required to analyze data collected in the classroom through the application of CATs are familiar to most faculty and can be as simple as those used to evaluate and score tests, assignments, and term papers. Others are perhaps less familiar to most, as in the application of cluster analysis to determine the

intercorrelations of students' performance on different assessment tasks. Here again, the difference in the methods of analysis is likely to be the result of the motivation on which the analysis is based. Simple analyses are generally used to give students and teacher feedback on how much and how well students are learning; more complex analyses would generally be used to support research that provides insights into how students learn.

Interpreting the results of the feedback obtained through the analysis of classroom data is an important prerequisite step in considering the need for an instructional response or other educational modification. Such judgments are usually based on the application of explicit or implicit criteria that may be connected to an external standard, such as a national norm, or an internal standard, such as a class average. In any case, it is important to note that in classroom assessment, it is the teacher, not the institution that develops or chooses criteria to fit the purpose of making instructional improvement decisions. Performance questions are usually involved in the setting of assessment criteria; for example:

- How many students are learning well and how many are not?
- How well are students learning various elements of the course?
- How much of the course content are students learning?
- What parts of the course content are students learning?

As a case in point, consider the experience of the physics instructor who was to assess students' problem-solving skills by asking them to document their solutions to and difficulties with sets of problems of planned difficulty. What originally prompted this instructor to focus on this teaching goal might have been the fact that few students were aware of the ways they solve problems and could not easily adjust their approaches to new situations. In addition, some may not have been able to articulate how, why, or where they were stuck when they encountered difficulty. Students' documented solutions to the problem sets assigned will certainly permit the instructor to monitor the solution paths that led to success and those that led to mistakes. To focus the results, this would be done for three different types of responses: one type, for which the solutions were correct and the problem-solving steps were well documented; another, which had well documented problem-solving steps but incorrect answers; and the last, having poorly documented problem-solving steps. This should give the instructor the feedback needed to identify the areas of the problem-solving method students were taught that were most misapplied and to determine where and why in the method students were at a loss as to how to proceed. Once the causes of students' difficulties become clear, the instructor can then decide how to deal with the findings and prepare an instructional response to students' underachievement.

Thinking through how to respond to students' feedback in ways that will also help them improve their own learning is the culminating challenge of the evaluation step of the assessment paradigm. Decisions about desirable modifications are inevitably based

on faculty judgments about *why* students responded the way they did in the assessed learning task(s) rather than the way they were expected to respond. For this reason, many CATs include the question “why” in the responses they seek, so that students’ own reasons for their response can contribute to the interpretation and evaluation of the data.

### **Step 5 - Formulating Modifications**

An instructor’s response to assessment results can range from simply sharing the feedback with students for their improvement to restructuring lessons or entire courses. The issue in these decisions is simply: What has the classroom assessment experience indicated about how to improve student learning? Revise the teaching — how and how much? Of course, not all assessments will point to the need for change. At times, the results of classroom assessment may serve to document successful practices with respect to teaching and learning and validate what teachers and students are already doing well and to the credit of the institution

For example, on the basis of the analysis conducted in step 4 of the GBA paradigm, the physics instructor might decide to share the information with the class and announce a modification of the grading practices for the course. Students would now be given credit for the explanation of the problem-solving steps on graded assignments. Those making a serious effort at documenting the steps and the problem-solving questions they ask themselves would receive up to full credit for the problem; those that do not would receive a maximum of 75%. During subsequent classes, it will probably become apparent that the extra credit has provided the extrinsic motivation for students to focus on the effort, even among those students who might not have been willing to engage in the earlier assessment tasks posed by the instructor because of the extra work involved.

The larger challenge would still be to convince students of the intrinsic value of improving their problem-solving skills. What modifications of the instructor’s teaching would help to make students self-aware problem-solvers? First, in class and on homework assignments, students’ attempts at explanation might be acknowledged and praised. Second, individual students might be asked to demonstrate their solutions at the board, and then others who solved the problems in different ways asked to demonstrate their solutions. Third, the instructor might bring in parallel but “messier” problems and students asked to outline in words the steps they would use to solve them. Sometimes students might work in groups to compare and organize their different approaches. The class itself would begin to recognize an improvement in their problem-solving abilities, an improvement that will probably be even more dramatic among the weaker students. Through student demonstrations and peer instruction, students may learn to articulate the steps and master problem-solving methods more effectively.

What can be seen from this example are the ways that the teaching of a course can change by assessment. Because the instructor learned that explicit awareness of problem-solving was deficient in his students and because it was considered so crucial to the success of the students in that class, as well as other disciplines, the instructional

practices of the course were restructured to deal explicitly with problem-solving rather than assuming its development in students on the basis of the solutions they accomplish on test problems. As this instructor found, testing can tell what kind of knowledge someone has, not the nature, extent, and quality of their ability. Assessment aims to elicit these things, out of which future performance can be built.

# **SECTION III**

## ***IMPLEMENTATION AND CAMPUS PROCESS***

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### **WORK OF CLASSROOM FACULTY**

There are three phases to the work of classroom assessment: planning, implementing, and responding. In working through these stages, faculty should not attempt to assess all areas of student learning. Rather, each assessment should be regarded as an "experiment" in which one or a few areas will be examined and, perhaps, re-examined to refine the results the experiment produces. Thus, typically, an instructor will focus on one or two principal teaching goals at-a-time and use one or more of the Classroom Assessment Techniques (CATs) described earlier to conduct the assessment. The following summarizes the procedural steps involved in the planning, implementing and responding phases of the process:

#### **PHASE I - PLANNING CLASSROOM ASSESSMENT ACTIVITIES**

1. Select the class to focus on and plan the assessment in concert with other faculty teaching the same course.
2. Focus on one or two main teaching goals for the course, selected from the TGI, and reduce the goal(s) to course-specific terms.
3. Identify student behaviors thought to be important outcomes of the learning.
4. Select, adapt or design CATs for obtaining feedback appropriate to the teaching goal(s). Work out its integration into ongoing classroom activities.
5. Use the Assessment Matrix to communicate your design to others (e.g., assessment committee, other faculty)

#### **PHASE II - IMPLEMENTING CLASSROOM ASSESSMENT ACTIVITIES**

6. Teach the target unit related to the teaching goal being assessed.

7. Administer the CAT(s) and collect feedback. Where appropriate, make the purpose clear to students, explain the technique carefully and completely to them, and, where possible, encourage feedback with the use of open-ended questions.
8. Analyze student feedback concerning the course-specific goal and related behavioral outcomes. The method of analysis will depend on the CAT used and whether the instructor needs to know how much or how many (quantitative analysis) or simply what, or in what ways (qualitative analysis).

### PHASE III - RESPONDING TO FEEDBACK FROM CLASSROOM ASSESSMENT ACTIVITIES

9. Interpret the results jointly with other faculty and formulate an appropriate response that helps the instructor and the students.
10. Communicate the results (both good and bad) to students. Plan to try out a response, informing students of how the teaching will be modified and what adjustments they will need to make.
11. Evaluate with other faculty the impact of the assessment on teaching and learning and other needed modifications. Communicate the results by completing the Assessment Matrix.

### CAMPUS ROLES AND RESPONSIBILITIES

#### DEPARTMENTAL ASSESSMENT COMMITTEE

The work of departmental faculty in conducting classroom assessments, as described above, is coordinated by a Departmental Assessment Committee, which reports to the department chair and maintains a regular dialogue with the Assessment Committee of the Academic Senate (ASAC), as part of that Committee's mentoring and monitoring procedures.

#### COLLEGE-WIDE ASSESSMENT COMMITTEE

The ASAC, in conjunction with the academic affairs administration, has primary responsibility for *monitoring* the progress of assessment across the College's varied instructional departments, providing appropriate *mentoring* to those departments requiring it, assuring *compliance* with the goals and requirements of the College's assessment plan, and maintaining a regular *dialogue* with the Vice President for Academic Affairs on these and other matters pertaining to academic assessment at Nassau Community College. Both the monitoring and mentoring functions of the



Committee are conducted through the assignment of departmental liaison responsibilities to individual members of the ACAS. For this purpose, the membership of the Committee is appointed to include at least one member from each department. Several academic affairs administrators are also assigned to participate in the Committee's work by the Vice President for Academic Affairs.

The Office of Institutional Research maintains the primary administrative support role to the ASAC by which the Assistant Dean for Academic Affairs for Institutional Research facilitates the needs of the ASAC through the resources of OIR and recommends other institutional resources and support, as needed. At present, OIR devotes one half-time position exclusively to the activities of the ACAS in operationalizing academic assessment at the College.

### VP for ACADEMIC AFFAIRS

The Vice President for Academic Affairs, either directly or through the Dean of Instruction, assumes the role of facilitating college-wide compliance with institutional assessment needs as regards both accountability (summative assessment) and improvement of teaching and learning (formative assessment); for coordinating academic assessment with other evaluative initiatives, such as program review, and strategic planning; and for utilizing academic assessment to inform the decision making processes of the College. To advance the visibility of these roles, the Vice President for Academic Affairs will designate several academic administrators to participate in the monitoring/mentoring work of the ACAS and will address the Committee periodically as to the needs and goals of the institution concerning academic assessment. As part of this dialogue, the ACAS will submit to the Vice President for Academic Affairs an Annual Report summarizing the progress of academic assessment across the campus and, where possible, analyzing its implications for the improvement of teaching and learning at the College.

### INSTITUTIONAL RESEARCH

As part of its coordinating and facilitating roles, the Office of Institutional Research will serve as the repository of the materials and reports that document the course-level assessments conducted by all instructional departments. In addition, OIR and the ACAS will advance research initiatives to develop specific approaches for assessing student learning and development in three other areas of the college mission:

- *Program Concentrations* - Development of departmental methodologies for assessing cumulative learning in the major (i.e., course aggregate methods, capstone methods, portfolio methods).
- *General Education* – Literature-based definition of institutional learning objectives for general education and the development of a framework for associating general education objectives with specific courses in the college curriculum.



- *Student Development* - Development of a framework for assessing the personal and social development of students resulting from the opportunities provided through the College's co-curricular activities, services and programs.

## ASSESSMENT SYMPOSIUM

As the ultimate purpose of assessment is to advance faculty's understanding of how students learn and how best to teach them, the process of assessment should provide a forum for communicating - as research - the results of the College's assessment activities to all faculty. Such a forum should seek to draw conclusions and generalizations about teaching students in particular classrooms and to develop theories and strategies about teaching and learning that are of general value. To further this goal, the faculty of each department is expected to disseminate the results of its assessment experiments for the benefit of peers and the advancement of the teaching profession. For this purpose, the ACAS will coordinate a periodic Assessment Symposium to disseminate the work of the College's faculty and develop an institutional commitment to pedagogical research.

## CURRENT PROGRESS

In Fall of 1997, the ASAC and OIR began their charges by defining for the College community the conceptual framework, practices and implementation policies of academic assessment in the first edition of this manual (Concepts & Procedures for Academic Assessment, NCC, Fall 1997). In that document, the methodology for assessing student learning on a course-by-course basis was conceptualized and exemplified in terms of the five-step Goals Based Assessment paradigm.

Though the new GBA paradigm retained much of the language of the previous GAFID model, the focus of the framework and attending methodology was different. Unlike GAFID, the GBA focuses more directly on the identification and implementation of specific classroom assessment activities to collect feedback from students in the process of their learning. Feedback by which classroom faculty would be expected to conclude how students are responding to particular instructional approaches and to use this information to develop and implement specific modifications that refocus their teaching and adjust the methods of learning of their students.

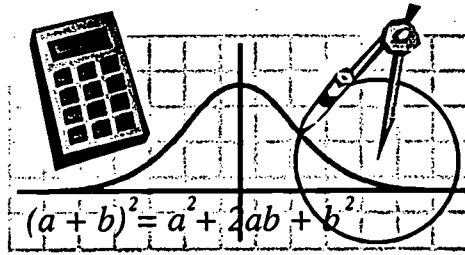
During AY 1997-98 the teaching faculty within each academic department designed and piloted the implementation of classroom assessments for two multi-section courses according to the Committee's procedures manual. This pilot effort required the assessment of student achievement relative to six principal, faculty-defined learning goals using uniform measurement approaches in all sections of the selected courses. In all, twenty-six of the thirty departments completed and reported the results of their pilot experience by the end of the 1997-98 academic year and submitted tentative designs for initializing assessments in all other departmental courses.

During the Summer of 1998, a subcommittee of the ASAC reviewed the departmental pilot materials and prepared a response to each department that included recommendations to strengthen the assessment designs and an activity plan for commencing on-going assessments in all departmental courses by academic year 1999-2000. By the end of the Fall 1998 Semester, meetings with 28 of the College's 30 academic departments were concluded, and each department were oriented to the activities, expectations and timeframes involved in implementing assessment in all departmental courses on an on-going basis. The expected activity plan for most departments is summarized as follows:

- Department faculty initiate course-level assessments of 2-3 basic instructional goals in the courses they teach according to the GBA paradigm. This is done for half the courses in 1998-1999 and half in 1999-2000. The process is on-going, examining other areas of expected learning during subsequent assessment cycles.
- Department reports assessment activities periodically to the ASAC which, in conjunction with OIR, monitors the progress and results of assessment across the College, and formulates college-wide conclusions for feedback to faculty and administration concerning the improvement of teaching and learning.
- Within the appropriate campus mechanisms designed or modified for this purpose, faculty communicate and are acknowledged for the achievement and scholarship of their assessment-based research in classroom teaching and learning.

During the 1998-99 academic year, the ASAC focused its efforts on several developments to support the activities of departmental faculty toward these goals:

- The preparation of this document as a revision of the Committee's Policies and Procedures Manual to include more specific instructions and examples concerning the formulation of teaching goals, behavioral outcomes, outcome measures, criteria and evaluation, and instructional modifications.
- Planning for the first Campus Assessment Symposium (March, 1999) to provide a forum for faculty to communicate, as research, the results and methods of their assessment-based inquiries into classroom teaching and learning.
- The development of literature-based teaching goals for general education, a method for associating these teaching goals with individual courses across the curriculum, and the identification of exemplary methods for assessing students' general learning at the classroom level.



## **NOTES:**

# SECTION IV

## ***CLASSROOM ASSESSMENT USER'S GUIDE***

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The purpose of this guide is to serve as a pragmatic, quick-reference to methods and examples involved in the formulation of a classroom assessment. Members of the college-wide Assessment Committee, who have themselves been participants in the classroom assessment process, contributed its contents. These faculty members, from a variety of disciplines, faced common challenges in the planning and implementation stages of the process, particularly when attempting to establish agreement on content and skill goals, behavioral outcomes and measurement instruments. They, more than others, know that the process of assessment must itself continuously evolve towards efficiencies and improvements in its own structure, language, goals, descriptions, methodologies and communication if it is to be successful in achieving the same for teaching and learning.

The Classroom Assessment User's Guide is written in less-technical language than other parts of this manual following the feedback and suggestions made by faculty who posed very practical questions and concerns, such as:

- What is the difference between a teaching goal and a behavioral objective?
- What are formative measurement instruments and how are they used in classroom assessment?
- What are summative measurement instruments and how are they used in classroom assessment?
- What are the purposes of the "evaluation" column in the GBA Matrix? What exactly is being evaluated?
- What is meant by "modifications" in the Matrix?
- How do we integrate ongoing assessment of learning without taking up too much class time?
- Once we get the measurement results, what next?
- How does classroom assessment help student learning?
- How does classroom assessment affect teaching styles and approaches?

## **THE ORGANIZATION OF THIS GUIDE**

The Guide is organized around the five columns of the GBA Matrix – *Teaching Goals, Outcome Behaviors, Measurements, Evaluation and Modifications* – which are the five component steps taken by faculty to carry out the process of classroom assessment. The basic features of the Guide's contents relative to these columnar steps are as follows:

- The basic format of the GBA Matrix is explained with special attention to the purpose, the definition and the information called for in each of the five entry columns
- Standard language constructs are identified for the column entries to provide greater clarity in the communication of GBA designs and results. The language is non-technical to permit individuals who may be unfamiliar with assessment or the subject course to identify what it is students are expected to learn, what it is students are in fact learning, whether a teaching goal was achieved and what is to be the next step in the process.
- Examples of entries for each column of the Matrix are also included to illustrate the application of the standard language prescriptions in the application of the classroom assessment process to several different subject courses at NCC.
- The handy GBA-At-A-Glance included at the end of the Guide gives a quick overview of the entry prescriptions as well as a look at the completed Matrix for the selected subject courses.

In using the Guide, simply go to the heading that corresponds to the GBA column for which assistance is needed. This will, of course, depend on the point at which you are within the classroom assessment process. For example, if you are still at the stage of defining teaching goals that articulate with student outcome behaviors, you may want to begin with the section on Teaching Goals. If, on the other hand, your department has already administered the measurement instrument and is ready to discuss results and decide what direction to take, you may be interested in the Evaluation and Modification sections.

After completing the review of the appropriate section(s), you can expect to be better equipped with the necessary strategies and tools to move forward in the classroom assessment process. If not, contact us – the ASAC team (2-7122) – for assistance; we travel to the site of the disaster, free of charge! Remember that assessment within the classroom environment is an integral part of our teaching lives at NCC. We, as faculty, are motivated by the conviction that our efforts are going to result

in more effective teaching, improved student learning and enhanced institutional excellence. Those who are less experienced at planning, developing and facilitating assessment should expect to rely on the experience of colleagues who have gone through the process. This is at it should be for there is nothing static or simple about the enterprise we are undertaking; what we learn from it, we must share with each other if we are to move toward our goal of excellence.

## **TEACHING GOALS**

The Purpose of Teaching Goals is to answer the following question: what main concepts, skills, and/or principles do you want your students to learn from this particular lesson, unit, or course? The teaching goal may focus on general education learning and/or discipline-specific learning that we expect of our students to acquire.

Standardized Language that can be used to construct the statement of a teaching goal includes such phrases as:

- ⇒ To teach....
- ⇒ To involve....
- ⇒ To develop an understanding of....
- ⇒ To help students to develop....
- ⇒ To enhance or to improve....
- ⇒ To develop the skills needed to....
- ⇒ To develop the ability to conceptualize, or  
to synthesize, or  
to analyze, or  
to transfer information to....

Some Examples of teaching goals for different disciplines are:

- ✍ To develop students' knowledge and understanding of the organizational structure of the hospital.  
(Allied Health Sciences)
- ✍ To improve students' listening skills.  
(Communications)
- ✍ To develop students' understanding of the meaning and measurement of inflation.  
(Economics-Finance)
- ✍ To teach students the statistical methods used to represent and describe large data sets.  
(Mathematics & Statistics)

- ✎ To teach students the 18 different weather elements located around a surface station model through a lab exercise in which these data are plotted for numerous U.S. cities and the state of the surface atmosphere is deduced.  
(Physical Science)
- ✎ To develop students' understanding of the patterns, courses and functions of group structure, group dynamics and formal organization in society.  
(Sociology)

## OUTCOME BEHAVIORS

The Purpose of Outcome Behaviors is to answer the following question: what are students expected to do (behaviors or actions) in order to demonstrate that the teaching goal was achieved (that the expected learning occurred)?

Standardized Language that can be used to construct the statement of an outcome behavior includes such phrases as:

- ⇒ Students will show....
- ⇒ Students will define....
- ⇒ Students will demonstrate....
- ⇒ Students will use....
- ⇒ Students will respond to....
- ⇒ Students will solve....
- ⇒ Students will identify....
- ⇒ Students will plot or draw....
- ⇒ Students will calculate or formulate....
- ⇒ Students will apply....
- ⇒ Students will discuss or describe or write....
- ⇒ Students will distinguish....
- ⇒ Students will explain....

Some Examples of outcome behaviors for different disciplines are:

- ✎ Students will demonstrate a knowledge of the organizational structure of hospitals of different types in terms of support and ownership.  
(Allied Health Sciences)
- ✎ Students will be able to evaluate their level of indulgence (from almost always to almost never) in the use of effective and ineffective listening skills.  
(Communications)
- ✎ Students will distinguish different levels of inflation (normal inflation, hyperinflation, disinflation, and deflation) by



calculating a consumer price index using hypothetical data.  
(Economics-Finance)

✎ Students will be able to reduce a set of statistical data to a frequency distribution, calculate the mean, mode and standard deviation of the distribution, and interpret these measures for samples and for populations.  
(Mathematics & Statistics)

✎ Students will be able to decode various station models to determine the present weather at each of the given locations.  
(Physical Science)

✎ Students will define and describe the major sociological concepts governing the empirical findings on group structure and group dynamics.  
(Sociology)

## MEASUREMENTS

The Purpose of the Measurements in goals-based assessment is to answer the following question: what strategies (activities / tools / instruments / devices / techniques) will be used to demonstrate the extent to which the teaching goal was achieved (to elicit the previously defined behavior as a gauge of the extent to which the intended learning took place). The measurement instrument used for this purpose may assume a formative design to provide an informal evaluation confirming that the expected learning took place or it may assume a summative design to give a more formal evaluation of the expected learning and its occurrence.

To evaluate student learning formally (summatively) you may use quizzes, tests (short essays, true-false, pre-tests / post-tests), critique essays, term papers, lab reports, homework assignments and any kind of customized exercises or projects. Evaluations of this kind are usually assigned grades and tend to indicate learning achievement at the *end* of lessons, units or courses.

To evaluate student learning on an informal (formative) basis you may pose questions, solicit questions and comments, initiate discussion, elicit student feedback on how well learning took place or what they are actually learning. Any customized exercises may be used. Evaluations of this nature tend to assist faculty to monitor their teaching and/or determine if students have understood a particular lesson, unit, concept or topic, and are ready to move on. These informal measurements are used *throughout* the semester and are intended to complement formal evaluation instruments. Formative instruments may be, but usually are not graded.

Whether you use formal or informal measurement instruments (techniques / devices / activities / tools), you will need to set definite criteria or levels of proficiency for students' performance on the measurement task. These act as indicators that confirm that *satisfactory* learning (i.e., that an *expected* achievement of the teaching goal), has

occurred. The criterion or proficiency standard that you (the instructor) sets should answer the question: what basic level or extent of achievement will enable you to discern that students have learned and are ready to move on? What do you want them to demonstrate that they have learned? What basic percentage/ level / extent / nature of achievement will confirm that the intended teaching goal was satisfactorily attained and that you are ready to proceed with the lesson or unit or course? What do you plan to do if the intended teaching goal was not satisfactorily attained? (Refer to Evaluation and Modifications columns.)

Standardized Language used to construct descriptions of measurements may include:

- ⇒ when presented with...students will be expected to ....
- ⇒ when shown a...students will be able to ....
- ⇒ when asked to perform...students will achieve \_\_\_\_%.
- ⇒ when given a multiple-choice quiz (exam)...students will attain at least \_\_\_\_%.
- ⇒ when given a 20 short answer test on...a student average of \_\_\_\_% is expected.
- ⇒ when asked to summarize...students are expected to use....
- ⇒ students will be able to...when given a....
- ⇒ students will be able to...when asked to....
- ⇒ when given a true-false quiz, students are expected to achieve \_\_\_\_%.
- ⇒ students will be asked to explain orally three concepts incorporating the vocabulary of....

*Reminder: The expected performance criteria should be determined before the next step (Evaluation) in the assessment process takes place.*

Some Examples of measurements for different disciplines are the following:

- ✎ Selected items on a written examination consisting of multiple choice, fill-in definitions, and matching columns will assess students' knowledge of the terminology associated with the organizational structures of hospitals of different support and ownership types. A passing performance level of 70% correct responses is expected of individual students. (Allied Health Sciences)
- ✎ Students will be given a pretest and posttest of listening skills to determine their use of effective listening skills. The performance proficiency on the posttest is set at 71%, resulting from an expected group gain of 42%. (Communications)
- ✎ When presented with hypothetical data on consumer spending (prices paid and amounts purchased), students will compute a series of simple price index numbers and from

them calculate inflation rates. 75% is the expected success rate for these tasks.  
(Economics-Finance)

✎ Students will construct both manually and with a graphing calculator a scatter plot and histogram of sample data they are assigned to collect. Students will also calculate descriptive statistics for sample data presented to them on a written test using both automated statistical functions of the calculator as well as through documented computational steps (performance criterion: 75%).  
(Mathematics & Statistics)

✎ When presented with a quiz containing data from a recent local weather observation, students will plot the data around a station model circle. 85% of the students are expected to complete this quiz task with a grade of 70 or better.  
(Physical Science)

✎ Students will summarize concrete examples of major empirical concepts of group structure and group dynamics identified on a written test and will respond, in essay form, to analytical questions involving the application of these principles. Expected performance level is 75%.  
(Sociology)

## EVALUATION

The Purpose of the Evaluation step is to analyze and interpret the measurement results in order to determine the extent to which the teaching goal is being achieved. A response to the question *how did the students do* is important in considering any need for instructional modification. This part of the assessment process requires a post-implementation discussion on the part of faculty (and, where appropriate, students) that reflects on such questions as: To what extent did learning take place? How did the measurement instrument / device reveal or even contribute to the achievement of the teaching goal? What changes, if any, need to be made? What does the student feedback tell us about how students learn? Focusing the data obtained from the measurement(s) on these questions will, almost certainly, prompt an analysis of the data using a variety of quantitative and/or qualitative methods and approaches.

Standardized Language that can be used to construct evaluation statements derived from an assessment measurement includes such phrases as:

- ⇒ The measurement showed that....
- ⇒ Faculty reviewed the results by ... and found that....
- ⇒ Students' responses demonstrated that....
- ⇒ An analysis of students' efforts toward these tasks reveals that....
- ⇒ A grouping of the results according to... indicated that....

Some Examples of evaluation statements that summarize the results of assessment measurements used in different disciplines are the following:

- ❏ Overall pass rate on the organizational terminology assessment was 79%, but an item analysis revealed a definite weakness on the part of students (50%) in identifying the staffing practices of the anesthesiology unit in both public and privately supported hospitals.  
(Allied Health Sciences)
- ❏ Each faculty member at the start/completion of the listening unit conducted the pretest/posttest assessment of listening skills, as it occurred in their respective classes. The mean performance on the posttest was 58%, considerably less than the 71% expectation, but the group gain of 60% was considerably more than the 42% norm.  
(Communications)
- ❏ Students (78%) demonstrated appropriate learning of inflation concepts by their ability to correctly compute required inflation numbers from consumer price numbers on the assessment exam. When presented with the underlying raw data on consumer spending, however, students were less successful (52%) in deriving a price index number.  
(Economics-Finance)
- ❏ The grade summary for the assessment of students' ability to construct statistical plots was above the minimum expectation (81% as compared to 75%) for the assigned task. Feedback indicated, however, that more than half the students obtained the subject data from other statistics textbooks rather than primary sources. Too many students (38%) who were capable of documenting manual calculations of descriptive statistics on the assessment exam were unable to perform same using the automated statistical functions of the calculator.  
(Mathematics & Statistics)
- ❏ 80 students who took the quiz were required to plot 10 current weather elements from LaGuardia Airport around a station model circle. 90% of the students earned a grade of 70 or better, indicating the success of the lab exercise as an instructional tool in teaching students about weather data encountered around a surface station model.  
(Physical Science)
- ❏ Students' ability to identify examples of empirical concepts on the first assessment exam was below expectations. A significant gain in correct answers was, however, observed in a subsequent assessment that followed a detailed review of the first exam. Students ability to respond, in essay form, to analytical questions involving the application of principles was initially as expected (75%) and also showed a marked gain (82%) on the second exam.  
(Sociology)

## **MODIFICATIONS**

The Purpose of the Modifications is twofold. Analysis of the results of the classroom assessment may simply serve to report and document successful teaching and learning practices. It may, also, serve to indicate the need for actions to improve the achievement of teaching goals and student learning. Once implemented, such modifications provide the basis for subsequent assessments that test their effectiveness in producing intended improvements. In this way, assessment becomes an evolving process.

The modification step of the assessment process answers the following questions: What has the classroom assessment experience indicated about how to improve student learning or teaching strategies? What kinds of changes are needed for these purposes? What changes should be made with respect to the measurement instrument and/or the expected behavioral outcomes, and/or the intended teaching goals?

Standardized Language that might be used to construct statements about modifications include such phrases as:

- ⇒ It is recommended that instructional practices in this area of learning be modified by....
- ⇒ Students' learning practices in this area should be modified by....
- ⇒ In the future, to assess students' performance in this area of learning it is recommended that the measurement strategy/instrument be modified by....
- ⇒ Consistent with student feedback, the support derived from... should be modified to....
- ⇒ In light of these evaluations, the following general/specific recommendations concerning course content are made: ....

Some Examples of evaluation statements that summarize the results of assessment measurements used in different disciplines are the following:

- 📖 Develop group learning techniques, such as role playing a hospital institution's organizational structure.  
(Allied Health Sciences)
- 📖 Faculty decided that the listening pretest-posttest should be administered in the first and last sessions of the course to provide a more realistic time for students to "habitualize" the skills taught in the listening unit. It was also agreed that faculty will define common criteria, terms, and behaviors of effective listening to emphasize in the course content.  
(Communications)
- 📖 In light of the results, it is recommended that the course content be modified to include instruction and student

experiences that deliberately focus on the sharpening of students' quantitative skills.  
(Economics-Finance)

It is recommended that formal instruction on the use of the statistical functions of the calculator be a uniform practice in all sections of the course. Faculty should also consider a brief unit on sources of statistical data, incorporating the Internet as a major data-finding tool that is applied to correlate course material to real life applications  
(Mathematics & Statistics)

While the intended learning about surface station models appears to be well achieved by the strategy of the laboratory exercise on the subject, the exercise is in need of modification to use more current data now available on the Internet. The exercise should also be expanded to deliberately include the element of pressure change, which is not addressed in the current version. About 46% of the student responses were incorrect in the plotting of this element.  
(Physical Science)

In light of the assessment results, class time should be allocated to the discussion of specific examples that illustrate each of the major empirical concepts of group structure and group dynamics.  
(Sociology)

### **GBAs AT-A-GLANCE**

*Congratulations!* If you are reading this section of the Manual it is probably because you have looked at the earlier sections and have gleaned an idea of how the process of classroom assessment is supposed to go. Your gratification may be further enhanced by the knowledge that you are also approaching the end of this document. But not before you consider how the needed information about an application of classroom assessment should be documented to others

The five steps of Goals Based Assessment (GBA) are communicated to other faculty by recording the statements pertaining to Teaching Goals, Outcome Behaviors, Measurements, Evaluations and Modifications, as described above, in the appropriate columns of the GBA Matrix Form. The purpose of the GBA Matrix (or simply "GBA") is to provide a uniform format for communicating the designs, implementations and results of classroom assessments to other interested parties. It is essentially a clerical tool that is designed to provide an "executive summary" of the pertinent documentation and results of the goals based assessments conducted by faculty in their classrooms.

The remainder of this User's Guide contains a variety of GBAs for quick reference. Following a blank GBA, which can be copied for faculty use in their own assessment activities, is a GBA containing the various elements of standardized language used to formulate the entry statements for each of the five columns. This is



followed by several completed GBAs that serve to illustrate the assessments from different academic disciplines cited in earlier examples.

*AND  
NOW....*

*....THE  
GBAs*

# ASSESSMENT MATRIX

COURSE: \_\_\_\_\_

Teaching Goal What it is faculty are trying to teach students in a particular lesson, unit or course.	Outcome Behaviors Observable behaviors or actions on the part of students that demonstrate that the learning intended in the teaching goal has occurred.	Measurements Design of strategies / techniques / instruments for collecting feedback data that evidence the extent to which the desired behaviors are demonstrated by students.	Evaluation Results of analyses and interpretations of the measurement data that determine the effectiveness with which the teaching goal is being achieved.	Modifications Recommended actions for improving the achievement of teaching goals that respond to the measurement evaluation.

# ASSESSMENT MATRIX - KEY TO STANDARD LANGUAGE & PHRASES

GOALS	BEHAVIORS	MEASUREMENTS	EVALUATIONS	MODIFICATIONS
<p>Answer this question:</p> <p>What main concepts, skills and/or principles do you want your students to learn?</p> <p>Language i.e.:</p> <ul style="list-style-type: none"> <li>.to teach.....</li> <li>.to involve.....</li> <li>.to develop.....</li> <li>.to understand.....</li> <li>.to enhance.....</li> <li>.to develop skills needed to.....</li> <li>.to develop ability to conceptualize or synthesize or to analyze.....</li> <li>.to transfer information to.....</li> </ul>	<p>Answer this question:</p> <p>What are students expected to do to achieve that learning occurred?</p> <p>Student will:</p> <ul style="list-style-type: none"> <li>Demonstrate .apply .respond to</li> <li>Differentiate .explain .solve</li> <li>Distinguish .relate .identify</li> <li>Determine .list-plot .draw</li> <li>Describe .enumerate .calculate</li> <li>Define .find</li> <li>Discuss .formulate</li> <li>Show .use</li> </ul>	<p>Answer this question:</p> <p>What strategies (activities, tools, instruments, devices, techniques) will be used?</p> <ul style="list-style-type: none"> <li>a. Formal(Summative) i.e.: quizzes, tests, essays, true-false tests, pre and post tests, critique essays, term papers, lab reports, homework assignments, customized exercises or projects.</li> <li>b. Informal (Formative) i.e.: pose questions, comments, initiate discussion, elicit student feedback</li> </ul> <p>Use the following languages to construct measurements:</p> <ul style="list-style-type: none"> <li>.When presented with.....students will be expected to.....</li> <li>.When asked to perform..... students will achieve ____%</li> <li>.When asked to summarize..... students are expected to.....</li> <li>.Students will be able to..... when given a.....</li> <li>.Students will be able to.....when asked to.....</li> <li>.When given a true-false quiz students are expected to achieve ____%</li> <li>.Students will be asked to explain orally three concepts incorporating the vocabulary of.....</li> </ul>	<p>To analyze and interpret the measurement results to determine that the teaching goal is achieved.</p> <p>Answer this question:</p> <p>How did the student do?</p> <ul style="list-style-type: none"> <li>.the measurement instruments used tended to show that.....</li> <li>.faculty reviewed the results and found that.....</li> <li>.students responses demonstrated that.....</li> <li>.the results indicated that.....</li> </ul>	<p>.To provide analysis and to report and document teaching and learning practices</p> <p>.To serve as a recommendation for actions to improve the achievement of teaching goals and student learning</p> <p>.Answer this question:</p> <p>What has the classroom assessment experience indicated about how to improve student learning or teaching strategies.</p> <p>.Is there a need for change with respect to:</p> <ul style="list-style-type: none"> <li>.measurement instruments</li> <li>.behavior outcomes</li> <li>.teaching goals</li> </ul>

# A S S E S S M E N T   M A T R I X

COURSE : INTRODUCTION TO ALLIED HEALTH SCIENCES

Teaching Goal What it is faculty are trying to teach students in a particular lesson, unit or course.	Outcome Behaviors Observable behaviors or actions on the part of students that demonstrate that the learning intended in the teaching goal has occurred.	Measurements Design of strategies / techniques / instruments for collecting feedback data that evidence the extent to which the desired behaviors are demonstrated by students.	Evaluation Results of analyses and interpretations of the measurement data that determine the effectiveness with which the teaching goal is being achieved.	Modifications Recommended actions for improving the achievement of teaching goals that respond to the measurement evaluation.
To develop students' knowledge and understanding of the organizational structure of the hospital.	Students will demonstrate a knowledge of the organizational structure of hospitals of different types in terms of support and ownership.	Selected items on a written examination consisting of multiple choice, fill-in definitions, and matching columns will assess students' knowledge of the terminology associated with the organizational structures of hospitals of different support and ownership types. A passing performance level of 70% correct responses is expected of individual students.	Overall pass rate on the organizational terminology assessment was 79%, but an item analysis revealed a definite weakness on the part of students (50%) in identifying the staffing practices of the anesthesiology units of both public and private hospitals.	Develop group learning techniques, such as role playing a hospital institution's organizational structure.

# ASSESSMENT MATRIX

COURSE : Communications – Gen. Ed. Goal I

Teaching Goal What it is faculty are trying to teach students in a particular lesson, unit or course.	Outcome Behaviors Observable behaviors or actions on the part of students that demonstrate that the learning intended in the teaching goal has occurred.	Measurements Design of strategies / techniques / instruments for collecting feedback data that evidence the extent to which the desired behaviors are demonstrated by students.	Evaluation Results of analyses and interpretations of the measurement data that determine the effectiveness with which the teaching goal is being achieved.	Modifications Recommended actions for improving the achievement of teaching goals that respond to the measurement evaluation.
To improve listening skills.	Students will be able to evaluate their level of indulgence (from almost always to almost never) in effective and ineffective listening skills: "giving in to mental distractions; giving in to physical distractions; trying to recall everything a speaker says; rejecting a topic as uninteresting before hearing a speaker; faking paying attention; jumping to conclusions about a speaker's meaning; deciding a speaker is wrong before hearing everything she or he has to say; judging a speaker on personal appearance; not paying attention to a speaker's evidence; focusing on delivery rather than on what the speaker says".	Students will be given a pretest and posttest of listening skills to determine the extent to which listening behaviors are changed.  Performance proficiency is set at 71%.	This pretest and posttest format was administered by each faculty member at the start as well as the point of completion of the listening unit, as it was offered in his/her respective course syllabus.  Performance proficiency was set at 71%. Final group total was calculated to be 57%.	A meeting of all faculty teaching the course was held. Discussion revealed the following: This Gen. Ed. goal is an important one for life skills. Although a pretest/posttest format is a viable measurement instrument, sufficient time is needed to enable students to integrate new strategies (in this case, listening strategies) into their behavioral patterns and to show meaningful changes. It was decided that this listening pretest/posttest will be administered in the first and last session of the term. It was also suggested that further discussion will be needed to define common criteria/terms/behaviors of effective listening strategies as emphasized in course content.

# ASSESSMENT MATRIX

COURSE : ECONOMICS & FINANCE

<b>Teaching Goal</b> What it is faculty are trying to teach students in a particular lesson, unit or course.	<b>Outcome Behaviors</b> Observable behaviors or actions on the part of students that demonstrate that the learning intended in the teaching goal has occurred.	<b>Measurements</b> Design of strategies / techniques / instruments for collecting feedback data that evidence the extent to which the desired behaviors are demonstrated by students.	<b>Evaluation</b> Results of analyses and interpretations of the measurement data that determine the effectiveness with which the teaching goal is being achieved.	<b>Modifications</b> Recommended actions for improving the achievement of teaching goals that respond to the measurement evaluation.
To develop students' understanding of the meaning and measurement of inflation.	Students will distinguish different levels of inflation (normal inflation, disinflation and deflation) by calculating a consumer price index using hypothetical data.	When presented with hypothetical data on consumer spending (prices paid and amounts purchased), students will compute a series of simple price index numbers and from them calculate inflation rates. 75% is the expected success rate for these tasks.	Students (78% of them) demonstrated appropriate learning of inflation concepts by their ability to correctly compute required inflation numbers from consumer price numbers on the assessment exam. When presented with the underlying raw data on consumer spending, however, students were less successful (52%) in deriving a price index number.	In light of the results, it is recommended that the course content be modified to include instruction and student experiences that deliberately focus on the sharpening of students' quantitative skills.



# ASSESSMENT MATRIX

COURSE : MATHEMATICS & STATISTICS

Teaching Goal What it is faculty are trying to teach students in a particular lesson, unit or course.	Outcome Behaviors Observable behaviors or actions on the part of students that demonstrate that the learning intended in the teaching goal has occurred.	Measurements Design of strategies / techniques / instruments for collecting feedback data that evidence the extent to which the desired behaviors are demonstrated by students.	Evaluation Results of analyses and interpretations of the measurement data that determine the effectiveness with which the teaching goal is being achieved.	Modifications Recommended actions for improving the achievement of teaching goals that respond to the measurement evaluation.
55 To teach students the statistical methods used to represent and describe large data sets.	Students will be able to reduce a set of statistical data to a frequency distribution, calculate the mean, mode and standard deviation of the distribution, and interpret these measures for samples and for populations.	Students will construct both manually and with a graphing calculator a scatter plot and histogram of sample data they are assigned to collect.  Students will also calculate descriptive statistics for sample data presented to them on a written test using both the automated statistical functions of the calculator as well as through computational steps that document the protocols.  Expected performance level is 75%.	The grade summary for the assessment of students' ability to construct statistical plots was above the minimum expectation (81% compared to 75%) for the assigned task.  Feedback indicated however, that more than half the students obtained the subject data from other statistics textbooks rather than intended primary sources.  Too many students (38%) who were capable of documenting manual calculations of descriptive statistics on the assessment exam were unable to perform same using the automated statistical functions of the calculator.	It is recommended that formal instruction on the use of the statistical functions of the calculator be a uniform practice in all sections of the course.  Faculty should also consider a brief unit on sources of statistical data, incorporating the Internet as a major data-finding tool that is applied to correlate course material to real life applications.

# ASSESSMENT MATRIX

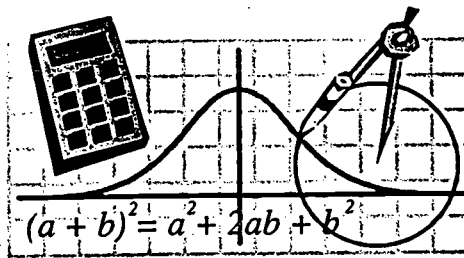
## Course - SCI 107 - Elements of Meteorology

Teaching Goal What it is faculty are trying to teach students in a particular lesson, unit or course.	Behavioral Outcomes Observable behaviors or actions on the part of students that demonstrate that the learning intended in the teaching goahas occurred.	Measurements Strategies / techniques / instruments for collecting feedback data that evidence the extent to which the desired behaviors are demonstrated by students.	Evaluation Analysis and interpretation of the measurement results to determine the effectiveness with which the teaching goal is being achieved.	Modifications Recommended actions that respond to the measurement results for improving the achievement of teaching goals
<p><b>SURFACE STATION MODEL</b></p> <p>To teach the standard location of the 18 different weather elements found around a surface station model.</p> <p>To develop an understanding that the surface station model conveys voluminous weather data in a confined space. When this data is plotted for numerous cities on a map of the U.S., the state of the atmosphere near the surface becomes apparent.</p>	<p>1. Students will plot sample station models using pre-recorded weather data, from 130 cities, found in the lab exercise. Students will plot only 12 of the 18 weather elements for each city.</p> <p>2. Students will decode various station models to determine the present weather at each of the given locations.</p> <p>3. Students will make a weather observation at Nassau Community College and plot this data around a station model.</p>	<p>1. Students will take a quiz which requires them to be able to decode a station model into its various weather elements.</p> <p>2. Students will take a quiz which requires them to plot data from a recent local weather observation around a station model circle.</p> <p>3. Students will be asked to a answer the short answer question: What is the purpose of a station model?</p>	<p>80 students took this quiz.</p> <p>For the quiz (Measurement # 2) students were asked to plot 10 current weather elements from LaGuardia Airport around a station model circle. One of these elements (pressure change) was taught but not utilized in the lab exercise.</p> <p>Analysis of students' efforts revealed that:</p> <ul style="list-style-type: none"> <li>36.3% earned a grade of 100</li> <li>23.8% earned a grade of 90</li> <li>17.5% earned a grade of 80</li> <li>12.5% earned a grade of 70</li> <li>6.3% earned a grade of 60</li> <li>3.8% earned a grade below 60</li> </ul> <p>The weather element on the quiz that was taught but not utilized in the lab exercise was pressure change. Student responses demonstrated that 46.25% of the students who took this quiz plotted this element incorrectly.</p> <p>This reveals that this lab exercise, which students often call busy work, does help them learn how and where the data is plotted on a weather map.</p>	<p>The learning intended in the laboratory exercise on plotting data around a surface station model has achieved it's goal. More than half of the students earned an A on the quiz and 96.2% of the students passed this quiz.</p> <p>It is recommended that the lab exercise on plotting surface station models be modified to use more current weather data that is now available on the Internet.</p> <p>In light of the results, we will modify the quiz so that it contains only weather elements that were a part of the lab exercise.</p>

# ASSESSMENT MATRIX

COURSE: SOCIOLOGY

Teaching Goal What it is faculty are trying to teach students in a particular lesson, unit or course.	Outcome Behaviors Observable behaviors or actions on the part of students that demonstrate that the learning intended in the teaching goal has occurred.	Measurements Design of strategies / techniques / instruments for collecting feedback data that evidence the extent to which the desired behaviors are demonstrated by students.	Evaluation Results of analyses and interpretations of the measurement data that determine the effectiveness with which the teaching goal is being achieved.	Modifications Recommended actions for improving the achievement of teaching goals that respond to the measurement evaluation.
59 To develop students' understanding of the patterns, courses and functions of group structure, group dynamics and formal organization in society	Students will define and describe the major sociological concepts governing the empirical findings on group structure and group dynamics	Students will summarize concrete examples of the major empirical concepts of group structure and group dynamics that are identified on a written test and will respond, in essay form, to analytical questions involving the application of these principles. Expected performance level is 75%	Students' ability to identify examples of empirical concepts on a first assessment exam was below the expectation level of 75%.  A significant gain in correct answers was, however, observed in a subsequent assessment that followed a detailed review of the responses on the first exam.  Students' ability to respond, in essay form, to analytical questions involving the application of principles was initially as expected (75%) and also showed a marked gain (82%) on the second exam.	60 In light of the assessment result, class time should be allocated to the discussion of specific examples that illustrate each of the major empirical concepts of group structure and group dynamics.



## NOTES :

# SECTION V

## RESOURCE GUIDE - PART A

### TEACHING GOALS INVENTORY

Please rate the importance of each of the fifty-two goals listed below to the specific course you have selected. Assess each goal's importance to what you deliberately aim to have your students accomplish, rather than the goal's general worthiness or overall importance to your institution's mission. There are no "right" or "wrong" answers; only personally more or less accurate ones.

For each goal, circle only one response on the 1-to-5 rating scale. You may want to read quickly through all fifty-two goals before rating their relative importance.

In relation to the course you are focusing on, indicate whether each goal you rate is:

- |     |                |  |
|-----|----------------|--|
| (5) | Essential      | a goal you always/nearly always try to achieve |
| (4) | Very important | a goal you often try to achieve                |
| (3) | Important      | a goal you sometimes try to achieve            |
| (2) | Unimportant    | a goal you rarely try to achieve               |
| (1) | Not applicable | a goal you never try to achieve                |

*Rate the importance of each goal to what you aim to have students accomplish in your course.*

	Essential	Very Important	Important	Unimportant	Not Applicable
1. Develop ability to apply principles and generalizations already learned to new problems and situations	5	4	3	2	1
2. Develop analytic skills	5	4	3	2	1
3. Develop problem-solving skills	5	4	3	2	1
4. Develop ability to draw reasonable inferences from observations	5	4	3	2	1
5. Develop ability to synthesize and integrate information and ideas	5	4	3	2	1
6. Develop ability to think holistically: to see the whole as well as the parts	5	4	3	2	1
7. Develop ability to think creatively	5	4	3	2	1
8. Develop ability to distinguish between fact and opinion	5	4	3	2	1
9. Improve skill at paying attention	5	4	3	2	1
10. Develop ability to concentrate	5	4	3	2	1
11. Improve memory skills	5	4	3	2	1
12. Improve listening skills	5	4	3	2	1
13. Improve speaking skills	5	4	3	2	1
14. Improve reading skills	5	4	3	2	1
15. Improve writing skills	5	4	3	2	1
16. Develop appropriate study skills, strategies, and habits	5	4	3	2	1
17. Improve mathematical skills	5	4	3	2	1
18. Learn terms and facts of this subject	5	4	3	2	1
19. Learn concepts and theories in this subject	5	4	3	2	1
20. Develop skill in using materials, tools, and/or technology central to this subject	5	4	3	2	1
21. Learn to understand perspectives and values of this subject	5	4	3	2	1

**Exhibit     Teaching Goals Inventory, Self-Scorable Version, Cont'd.**

<i>Rate the importance of each goal to what you aim to have students accomplish in your course.</i>		<i>Essential</i>	<i>Very Important</i>	<i>Important</i>	<i>Unimportant</i>	<i>Not Applicable</i>
22. Prepare for transfer or graduate study		5	4	3	2	1
23. Learn techniques and methods used to gain new knowledge in this subject		5	4	3	2	1
24. Learn to evaluate methods and materials in this subject		5	4	3	2	1
25. Learn to appreciate important contributions to this subject		5	4	3	2	1
26. Develop an appreciation of the liberal arts and sciences		5	4	3	2	1
27. Develop an openness to new ideas		5	4	3	2	1
28. Develop an informed concern about contemporary social issues		5	4	3	2	1
29. Develop a commitment to exercise the rights and responsibilities of citizenship		5	4	3	2	1
30. Develop a lifelong love of learning		5	4	3	2	1
31. Develop aesthetic appreciations		5	4	3	2	1
32. Develop an informed historical perspective		5	4	3	2	1
33. Develop an informed understanding of the role of science and technology		5	4	3	2	1
34. Develop an informed appreciation of other cultures		5	4	3	2	1
35. Develop capacity to make informed ethical choices		5	4	3	2	1
36. Develop ability to work productively with others		5	4	3	2	1
37. Develop management skills		5	4	3	2	1
38. Develop leadership skills		5	4	3	2	1
39. Develop a commitment to accurate work		5	4	3	2	1
40. Improve ability to follow directions, instructions, and plans		5	4	3	2	1
41. Improve ability to organize and use time effectively		5	4	3	2	1
42. Develop a commitment to personal achievement		5	4	3	2	1
43. Develop ability to perform skillfully		5	4	3	2	1
44. Cultivate a sense of responsibility for one's own behavior		5	4	3	2	1
45. Improve self-esteem/self-confidence		5	4	3	2	1
46. Develop a commitment to one's own values		5	4	3	2	1
47. Develop respect for others		5	4	3	2	1
48. Cultivate emotional health and well-being		5	4	3	2	1
49. Cultivate an active commitment to honesty		5	4	3	2	1
50. Develop capacity to think for one's self		5	4	3	2	1
51. Develop capacity to make wise decisions		5	4	3	2	1
52. In general, how do you see your primary role as a teacher? (Although more than one statement may apply, please circle only one.)						
1 Teaching students facts and principles of the subject matter						
2 Providing a role model for students						
3 Helping students develop higher-order thinking skills						
4 Preparing students for jobs/careers						
5 Fostering student development and personal growth						
6 Helping students develop basic learning skills						

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**Exhibit Teaching Goals Inventory, Self-Scoring Worksheet.**

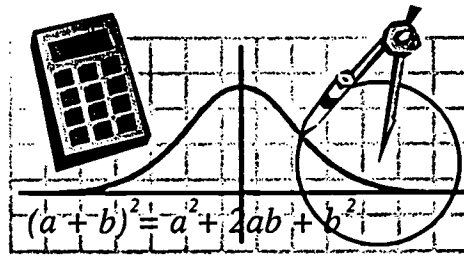
1. In all, how many of the fifty-two goals did you rate as "essential"? \_\_\_\_\_
2. How many "essential" goals did you have in each of the six clusters listed below?

<i>Cluster Number and Name</i>	<i>Goals Included in Cluster</i>	<i>Total Number of "Essential" Goals in Each Cluster</i>	<i>Clusters Ranked— from 1st to 6th— by Number of "Essential" Goals</i>
I Higher-Order Thinking Skills	1-8	_____	_____
II Basic Academic Success Skills	9-17	_____	_____
III Discipline-Specific Knowledge and Skills	18-25	_____	_____
IV Liberal Arts and Academic Values	26-35	_____	_____
V Work and Career Preparation	36-43	_____	_____
VI Personal Development	44-52	_____	_____

3. Compute your cluster scores (average item ratings by cluster) using the following worksheet.

<i>A</i>	<i>B</i>	<i>C</i>	<i>D</i>	<i>E</i>
<i>Cluster Number and Name</i>	<i>Goals Included</i>	<i>Sum of Ratings Given to Goals in That Cluster</i>	<i>Divide C by D's Number</i>	<i>Your Cluster Scores</i>
I Higher-Order Thinking Skills	1-8	_____	8	_____
II Basic Academic Success Skills	9-17	_____	9	_____
III Discipline-Specific Knowledge and Skills	18-25	_____	8	_____
IV Liberal Arts and Academic Values	26-35	_____	10	_____
V Work and Career Preparation	36-43	_____	8	_____
VI Personal Development	44-52	_____	9	_____

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## **NOTES :**

# SECTION V

## RESOURCE GUIDE - PART B

### OUTCOME GOALS OF GENERAL EDUCATION

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Study in *breadth* (general education) to compliment study in *depth* (the major) is an ideal that has guided American higher education since its inception. Despite the centrality of its role, however, the definition of general education has remained lacking in consensus and its particular emphases varied among institutions of higher education. Nevertheless, three themes appear to characterize the various interpretations and emphases associated with general education as an area of student learning:

- Building *general intellectual skills* for advanced studies and lifelong learning, including such higher order skills as analysis, problem solving, critical thinking, quantitative reasoning, and written and oral expression skills.
- Increasing understanding of the mainstreams of *human achievement*; that is, the variety of human works that constitutes human kind's response to enduring issues and needs as viewed through the study of the humanities, natural sciences, social sciences, and the arts.
- *Integrating learning* in ways that develop students' ability to confront large and complex issues and problems requiring the application of varied methods of inquiry from a variety of disciplinary fields.

The first effort on the part of the faculty at NCC to clarify the specific kinds of student learning sought within these broad intents came with the College's adoption of the following statement of the Goals of General Education at NCC (Ad-hoc Assessment Committee, 1989):

#### NASSAU COMMUNITY COLLEGE GOAL OF GENERAL EDUCATION

The goal of general education at Nassau Community College is to provide students with a broad-based learning foundation in the Arts and Sciences. This learning experience will enable students to do the following:

- Understand the ethical, intellectual, and cultural bases of individual and social behavior.

- Have the ability to conduct independent intellectual inquiry.
- Recognize the value of lifelong learning.
- Possess problem solving and decision making skills.
- Communicate effectively to diverse audiences.
- Have an understanding of science and mathematics adequate to make intelligent judgements about contemporary issues in science and technology.
- Understand the methodology and application of the social sciences.
- Have an understanding and appreciation of the arts and humanities.
- Have an understanding and appreciation of the value of positive health behavior on the quality of life.

The statement serves to identify several broad areas of learning (e.g., human behavior, intellectual inquiry, lifelong learning, problem solving, communication, etc.) in which students are expected to develop as a result of the general education acquired across the varied courses they pursue at the College. To assess students' actual achievement of such learning, however, further clarification of these goals is required that: (1) identifies the observable behaviors students are expected to demonstrate as outcomes of that learning, and (2) specifies those outcome behaviors in terms that can be connected to the specific courses students take and the elements of instruction that faculty provide

The first effort to develop an outcomes-based structure to facilitate the definition of specific teaching/learning goals within the broad areas enumerated in NCC's goal statement for general education was undertaken by the Office of Institutional Research in conjunction with the Middle States Self-Study Steering Committee as part of that Committee's preparations for the College's 1994 Accreditation review. The effort resulted in a Resource Paper on General Education (OIR, November, 1992) that culled, from a limited review of the literature on higher education, sixty-three learning outcomes in eight areas of general education, as follows:

- Communicative Skills (5 *outcome behaviors*)
- Quantitative Skills & Mathematical Methods (6 *outcome behaviors*)
- Critical Thinking & Problem Solving (8 *outcome behaviors*)
- Values & Judgement (7 *outcome behaviors*)
- Social Science Inquiry (12 *outcome behaviors*)
- Scientific & Technological Literacy (11 *outcome behaviors*)
- Experiencing the Humanities (8 *outcome behaviors*)
- Information & Research Literacy (6 *outcome behaviors*)

In 1993, the Ad-hoc Assessment Committee of the Academic Senate adopted these outcome statements as those intended in its 1989 broad goal statement, but sought no formal institutional approval of its action by the College's Academic Senate. Nevertheless, in 1996, in response to an accountability initiative calling for System-Wide Assessment of General Education (SUNY Policy Memorandum, October 1996), a renewed campus concern for the definition of general education was expressed in the annual charges directed to the Curriculum Committee and the Assessment Committee by the Academic Senate. In response to this charge, OIR initiated an effort to extend its review of the literature on general education beyond what had been undertaken in its earlier resource paper. The extended literature review, conducted as part of an OIR supported faculty doctoral dissertation (T. O'Brien, 1997), served to validate the sixty-three outcomes previously identified, while adding several more to the original inventory in three additional outcome areas:

- Personal Development & Human Relations (*8 outcome behaviors*)
- Holistic Health & Recreation (*4 outcome behaviors*)
- Creative Achievement (*4 outcome behaviors*)

The seventy-nine literature-based statements of the learning outcomes of general education are presented in this Resource Guide to help faculty define the teaching goals for students' general education as part of the ongoing Goals-Based Assessment conducted in the courses they teach. All that is needed is to first *select* one of the eleven goal statements and one or more of the associated outcome behaviors that represent a principal expectation of the instructional effort conducted in a given course. Then *adapt* each statement to the particular context(s) of the subject matter taught through which the outcome is expected to be achieved.

As a case in point, we consider the adaptation of the Critical Thinking goal of general education to the first semester course in College Physics cited in earlier sections of this Manual:

Teaching Goal : To develop students' critical reasoning skills (analogy, deduction and induction) by teaching them the methods of inference utilized in the formulation and application of the principles comprising the unifying theories of Newtonian mechanics and classical thermodynamics.

Outcome Behaviors : Students' logical reasoning skills shall be demonstrated by their ability to:

- (1) differentiate between the factual information, the assumptions (premises), and the conclusions involved in formulating an analysis of a mechanical or thermodynamic effect;
- (2) apply analogy to formulate an explanatory hypothesis concerning mechanical or thermodynamic effects;

- (3) distinguish between deductive and inductive reasoning strategies utilized to resolve a theoretical question concerning mechanical or thermodynamic effects.

In this example it is seen that the instructor formulated a teaching goal by modifying the specific language of the Critical Thinking goal to fit the particular emphases and subject matter being taught in the College Physics class. Similarly, course-specific outcome behaviors were formulated by selecting relevant parts of the generic Outcome Behaviors listed under the Critical Thinking goal to fit what the instructor expects students to learn to do from the teaching of critical thinking that occurs in that class.

Faculty may use the inventory in a similar way to formulate the course-specific teaching goals and associated outcome behaviors appropriate to the general education students are expected to derive from their classes. Specific language and emphases aside, most of the course-specific teaching goals and outcome behaviors that need to be considered are likely to be derivable from the generic ones listed in the inventory.

A helpful clerical tool in mapping the adaptation of general education goals and outcome behaviors to a given course is the General Education Course Analysis Form, a work sheet developed as a product of the OIR faculty dissertation project previously cited (T. O'Brien, 1997). The work sheet form is included at the end of the seventy-nine-item outcome inventory presented in the remaining pages of this part of the Resource Guide.

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### **COMMUNICATIVE SKILLS**

**GENERAL GOAL** : Teaching to develop students' ability to communicate (read, listen, write and speak) clearly and effectively to diverse audiences.

**OUTCOME BEHAVIORS** : Effective communicative skills are demonstrated by a student's ability to:

- read and listen analytically, with recognition and understanding of content and receptiveness to other points of view;
- write and speak clearly, accurately and fluently, with focus and continuity, using the conventions of standard American English language;
- organize, analyze, and evaluate information to develop and support a main idea, present information convincingly about a topic, and use language effectively to inform, persuade, and move an audience;
- recognize unstated assumptions and evaluate major claims and supports in written, oral, media and graphic presentations;



- identify parts of speech and the grammatical elements of a sentence, and recognize and correct flaws in diction, grammar, spelling and punctuation.

## **QUANTITATIVE SKILLS & MATHEMATICAL METHODS**

**GENERAL GOAL** : Teaching to develop students' quantitative skills and reasoning and their understanding of the concepts and methods of mathematics in specific areas of the subject discipline.

**OUTCOME BEHAVIORS** : Student's' competency in quantitative skills and mathematical methods is demonstrated by their ability to:

- apply basic methods of arithmetic, algebra, geometry and statistics for computational problems in a variety of theoretical and life situations;
- use the language, notation and deductive methods of mathematics to formulate quantitative ideas and patterns;
- describe specified mathematical models, or statistical designs and understand how they are used to obtain knowledge;
- define the role of mathematics in the development of civilization and the connection of mathematics to the arts, humanities and the sciences;
- use the techniques of statistical reasoning, calculate and interpret probability, and recognize inappropriate statistical reasoning and incorrect or misleading statistical data;
- understand the possibilities and significance of modern technology in mathematical applications, and the use of this technology to collect, process and present mathematical information.

## **CRITICAL THINKING & PROBLEM SOLVING**

**GENERAL GOAL** : Teaching to develop students' analytical reasoning skills, including the use of analogy, deduction and induction, and the ability to apply logical strategies in the solution of a wide variety of problems.

**OUTCOME BEHAVIOR** : Effective critical thinking and problem solving skills are demonstrated by a student's ability to:

- distinguish the problem or question from the solution or proposed answer;
- differentiate between conclusions, assumptions, and facts in the formulation of a solution or proposed answer;

- identify and evaluate connections between the supporting reasons and the statements they are supposed to support, and recognize and supply missing reasons which are needed to support or deny claims;
- recognize and evaluate the quality of evidence, including implicit presuppositions, validity of premises, weight of contrary evidence, emotional loading, reliability of sources, validity of comparisons, and relevancy;
- understand comparisons and connections within and between various fields of study, the nature of the definition or formulation of problems and questions pertaining to selected areas of study, and how different formulations of a problem can influence the solutions suggested to resolve it;
- analyze problems in terms of the information needed and the ways of finding that information through inspection, deduction, observation, experiment, consultation, historical investigation, and comparison;
- transfer, where applicable, learned skills, modes of inquiry, and information to new areas or problems;
- examine various strategies which might be used to solve a problem, select and apply a strategy appropriate to the problem, and evaluate the resulting solution, including its consequences.

### **VALUES & JUDGEMENT**

**GENERAL GOAL** : Teaching to develop students' ability to discriminate between and to make informed judgments about issues based on philosophical, religious, social, ethical and moral values.

**OUTCOME BEHAVIORS** : Effective judgment of issues based on value systems is demonstrated by a student's ability to:

- recognize conflicts between ethical value systems and distinguish ethical dilemmas from other conflicts;
- identify the major values and issues involved in personal life and life in society, including the nature, scope, and limits of human freedom, creativity, and responsibility;
- evaluate personal moral judgments and the moral judgments of others by recognizing an ethical issue, analyzing the rationales for different value choices, making an informed judgment based on that analysis, and assessing the implications of decisions made on the basis of values;
- assess a set of values for internal consistency, infer personal values from behavior, adopt and be aware of the ethical values involved in their positions, and understand how one's own moral beliefs differ from those of others;
- illustrate an understanding of major ethical principles, theories and traditions, and an awareness of the differing consequences which can result from the application of the major ethical theories to selected contemporary moral issues;

- understand and exhibit tolerance for the relativity and plurality of human values and beliefs, especially the multicultural values represented in society and the interdependence of the world's people in the evaluation of value conflicts;
- assess the ethical implications inherent in the practice of academic disciplines or professions and the important biological, economic, and environmental consequences resulting from the application of such values.

### **SOCIAL SCIENCE INQUIRY**

**GENERAL GOAL** : Teaching to develop in students an historical consciousness of the development of the major world civilizations as well as an understanding of the concepts, methodology, and applications of the social sciences in understanding human behavior, social institutions, and cultural diversity.

**OUTCOME BEHAVIORS** : Students' historical consciousness and understanding of the modes of inquiry of the social sciences are demonstrated by their ability to:

- apply historical information to the analysis of current issues and problems;
- describe the development of key institutions and the participants in the major events and movements that have shaped world history;
- demonstrate a general knowledge of the development of western civilization and other major world civilizations and similarities and differences between them;
- understand the concept of culture in terms of its major components, and analyze contrasting cultures in terms of those components;
- describe the characteristics of the various ethnic, racial, religious and gender subcultures that inhabit the United States as well as similarities and differences between them;
- locate and describe key characteristics of the major cultural regions, political units, nations, cities, bodies of water, and other geographical regions of the world;
- apply a knowledge of the effects of geographical, climatic, and topographical conditions to an understanding of the history and development of a culture;
- demonstrate knowledge of major social institutions such as family, education, government and religion, including the activities, responsibilities, freedoms, and restrictions within them;
- analyze major social problems, their various causes, and the possible effects of suggested remedies, including prejudice, discrimination and the impact of social inequality on the life choices of the individual;

- apply the constructs of major developmental theories to analyze the characteristics of human behavior, mental health, and interpersonal relationships;
- apply the basic principles of economics and political science to an understanding of the major features of the world's political and economic structures;
- gather information, analyze data, and draw conclusions in selected areas of the social sciences while recognizing practical problems and limitations in the use of social science data and research in decision making.

### **SCIENTIFIC & TECHNOLOGICAL LITERACY**

**GENERAL GOAL** : Teaching to develop in students an understanding of important concepts and methods of the physical and biological sciences and the ability to make judgments about contemporary issues in science, technology and health.

**OUTCOME BEHAVIORS** : Scientific and technological literacy is demonstrated by a student's ability to:

- explain the fundamental concepts, principles and theories of at least one science, and describe the products or effects of the fundamental processes in that science;
- recognize significant relationships among natural phenomena in the sciences in terms of such underlying concepts as matter, energy, chemical reaction, and living systems;
- understand the role of observation and experimentation in the development of scientific theories and recognize the principal involved in an experimental design;
- recognize appropriate procedures for gathering scientific information through laboratory and field work;
- make observations, develop hypotheses, conduct experiments, and solve problems in a selected area of the sciences;
- interpret and express the results of scientific information and experimentation in verbal, graphic, tabular and symbolic mathematical form, and draw conclusions and inferences from scientific observations or experimental results;
- understand the nature and role of technology and its impact on the individual, society and the environment;
- analyze current issues involving the impact of technology and develop critical responses to continuing technological development;
- describe the applications of technology for the achievement of practical purposes, especially for extensions of such human capabilities as the acquisition of knowledge through research, the processing of information, and the use and deployment of motor capability;

- solve problems through the application of selected technologies, including the utilization of computers in a variety of academic pursuits;
- understand the physiological and psychological bases of various approaches for maintaining life-long physical and mental health, such as exercise, nutrition, stress management, weight control, and use of leisure and discretionary time.

### **EXPERIENCING THE HUMANITIES**

**GENERAL GOAL** : Teaching to develop students' understanding of the aesthetic and intellectual experience of the humanities as humankind's response to the enduring need for creative expression through language, literature, philosophy and the arts.

**OUTCOME BEHAVIORS** : The effectiveness of students' experiencing of the humanities is demonstrated by their ability to:

- communicate in a major, non-English language, and understand the literature, arts and other cultural products of its people;
- analyze and evaluate literary works in terms of their linguistic and semantic features, literal and figurative language, historical contexts and relationships between form and content;
- recognize the historical sequences and significance of major literary figures, works, movements, and periods of world literature;
- appraise the cultural and historical significance of works of literature and art, their effect on society, and their contributions to language, literature, philosophy and the arts;
- analyze and evaluate the aesthetic, entertainment and didactic aspects of a work of art relative to its forms and genre;
- participate effectively in an aesthetic experience as creator or performer as well as informed observer;
- recognize and identify the artist's/author's insights into human capabilities, dilemmas, and aspirations;
- describe the major styles and elements of design or composition of music, art, theater and film.

### **INFORMATION & RESEARCH LITERACY**

**GENERAL GOAL** : Teaching students' to collect and interpret information as a means of sustaining their need to conduct research for lifelong learning.

**OUTCOME BEHAVIORS** : The information and research literacy of students is demonstrated by their ability to:

- identify and use general sources of information as well as those in their specific fields of specialization;
- define suitable research topics and design research strategies within appropriate and available information resources;
- collect and organize information about a topic through observation and through library and laboratory research, using appropriate information research technology;
- evaluate information on the basis of its origin, viewpoint, relevance, accuracy, completeness and other research criteria;
- analyze, interpret, classify, and synthesize information about a research topic;
- receive, interpret and communicate information through written, oral, or graphic form.

### **PERSONAL DEVELOPMENT & HUMAN RELATIONS**

**GENERAL GOAL** : Teaching or providing campus experiences through which students can develop personal skills, values and attitudes that enhance their own character as human beings as well as the quality of their relationships to others within a diverse society.

**OUTCOME BEHAVIORS** : The achievement of students' personal development and human relations is demonstrated by their ability to:

- assess and clarify personal values, and to formulate achievable, measurable, and challenging goals consistent with personal values;
- recognize personal strengths and limitations and employ strategies to capitalize on personal strengths and compensate for personal limitations;
- effectively use time management principles to manage the competing responsibilities encountered in their personal and academic lives;
- receive and use criticism constructively for themselves and to give constructive criticism for the betterment of others;
- adapt and use efficient learning techniques to acquire and apply new knowledge and skills;
- realize enhanced self-esteem as a result of their college experience;
- recognize and connect the elements complexity of human beings: their behavior, institutions, history, diverse societies, languages, and race relationships;
- apply their knowledge of human relationships in the development and enhancement of their own interpersonal relationships.

## **HOLISTIC HEALTH & RECREATION**

**GENERAL GOAL** : Teaching students to understand and deal with issues concerning their physical and mental well-being and the use of physical activity for health and recreation to enhance the quality of their lives.

**OUTCOME BEHAVIORS** : Students' learning of the principles and applications of holistic health and recreation is demonstrated by their ability to:

- develop and maintain a healthy lifestyle which encourages regular physical activity for increased self-satisfaction and self-esteem;
- engage in activities which will encourage participation by individuals in activities that benefit health, recreation, and personal satisfaction in their daily lives;
- identify and examine the major contemporary health issues of society, explore their impact on the individual as well as society, and investigate the method of prevention and control;
- identify their own health requirements and the methods needed to acquire a healthy lifestyle.

## **CREATIVE ACHIEVEMENT**

**GENERAL GOAL** : Teaching students to take factual information or data and bring to bear imagination, intuition and a logical thought process to effect an end product (an idea, a theory, or artifact) that is reflective of a unique understanding of the world, of the human condition, or of specific human problems, and the communication of that understanding to others.

**OUTCOME BEHAVIORS** : Students' understanding and application of the processes and methods of creative achievement is demonstrated by their ability to:

- understand the variety and range of artistic creativity that has resulted in the major artistic creations produced by human beings over time;
- compare the various forms of artistic creativity and describe how the various forms are interrelated through common principles;
- understand how the creative process occurs in an individual and to apply that understanding to the creation of an artifact;
- broaden their potential for creative achievement by developing expanded areas of interest and exploration.





# SECTION V

## RESOURCE GUIDE - PART C

### CLASSROOM ASSESSMENT TECHNIQUES (CATs)

This part of the Resource Guide contains three functional indexes of Classroom Assessment Techniques CATs, as described and exemplified in Classroom Assessment Techniques: A Handbook for Faculty (Angelo and Cross, 1993). The first is an alphabetical index of CAT names; the second, an index of CATs cross-referenced to examples from various academic disciplines; and the third is an index of CATs related to the teaching goal clusters of the Teaching Goals Inventory (TGI) presented in Part A of this Resource Guide.

Table CATs Indexed Alphabetically.

<i>Classroom Assessment Technique</i>	<i>CAT Number</i>	<i>Chapter Number</i>
Analytic Memos	12	7
Annotated Portfolios	18	7
Applications Cards	24	7
Approximate Analogies	15	7
Assignment Assessments	49	9
Audio- and Videotaped Protocols	22	7
Background Knowledge Probe	1	7
Categorizing Grid	8	7
Chain Notes	41	9
Classroom Assessment Quality Circles	45	9
Classroom Opinion Polls	28	8
Concept Maps	16	7
Content, Form, and Function Outlines	11	7
Course-Related Self-Confidence Surveys	32	8
Defining Features Matrix	9	7
Diagnostic Learning Logs	40	8
Directed Paraphrasing	23	7
Documented Problem Solutions	21	7
Double-Entry Journals	29	8
Electronic Mail Feedback	42	9
Empty Outlines	4	7
Everyday Ethical Dilemmas	31	8
Exam Evaluations	50	9
Focused Autobiographical Sketches	33	8
Focused Listing	2	7
Goal Ranking and Matching	35	8
Group Instructional Feedback Technique	44	9
Group-Work Evaluations	47	9
Human Tableau or Class Modeling	26	7
Interest/Knowledge/Skills Checklists	34	8
Invented Dialogues	17	7
Memory Matrix	5	7
Minute Paper	6	7
Misconception/Preconception Check	3	7
Muddiest Point	7	7
One-Sentence Summary	13	7
Paper or Project Prospectus	27	7
Pro and Con Grid	10	7
Problem Recognition Tasks	19	7
Process Analysis	39	8
Productive Study-Time Logs	37	8
Profiles of Admirable Individuals	30	8
Punctuated Lectures	38	8
Reading Rating Sheets	48	9
RSQC2	46	9
(Recall, Summarize, Question, Comment, and Connect)		
Self-Assessment of Ways of Learning	36	8
Student-Generated Test Questions	25	7
Teacher-Designed Feedback Forms	43	9
What's the Principle?	20	7
Word Journal	14	7

**Table 6.2. CATs Indexed by Disciplines in the Brief Examples.**

<i>Discipline</i>	<i>Technique</i>	<i>CAT Number</i>	<i>Chapter Number</i>
Accounting	Classroom Assessment Quality Circles	45	5
	What's the Principle?	20	7
Advertising/Graphic Arts	Content, Form, and Function Outlines	11	7
African-American Studies	Goal Ranking and Matching	35	8
Anthropology	Assignment Assessments	49	9
	Background Knowledge Probe	1	5
	Classroom Opinion Polls	28	8
	One-Sentence Summary	13	4
	Pro and Con Grid	10	7
Art/Humanities	Focused Listing	2	7
	Memory Matrix	5	7
Asian-American Studies	Double-Entry Journals	29	8
Astronomy	Categorizing Grid	8	5
	Misconception/Preconception Check	3	7
Biology	Categorizing Grid	8	7
	Defining Features Matrix	9	7
	Human Tableau or Class Modeling	26	7
	Misconception/Preconception Check	3	7
	One-Sentence Summary	13	7
	Pro and Con Grid	10	7
	Applications Cards	24	7
	Categorizing Grid	8	7
Business/Management	Directed Paraphrasing	23	7
	Empty Outlines	4	7
	Pro and Con Grid	10	7
	Problem Recognition Tasks	19	7
	Profiles of Admirable Individuals	30	8
	What's the Principle?	20	7
	Word Journal	14	7
	One-Sentence Summary	13	4
	Exam Evaluations	50	9
	Group Instructional Feedback	44	9
	Technique		
	Muddiest Point	7	7
Child Development	Empty Outlines	4	7
	One-Sentence Summary	13	4
Clinical Nursing Practicum			
Computer Science	Audio- and Videotaped Protocols	22	7
	Directed Paraphrasing	23	7
	Electronic Mail Feedback	42	9
Cosmetology/Vocational Education	Categorizing Grid	8	7
Counseling Education	Problem Recognition Tasks	19	7
	Analytic Memos	12	7
Criminal Justice	Classroom Opinion Polls	28	8
	Directed Paraphrasing	23	7
	Everyday Ethical Dilemmas	31	5
	Double-Entry Journals	29	8
	Self-Assessment of Ways of Learning	36	8
Drama, Theater Arts	Applications Cards	24	7
	Concept Maps	16	7
Economics			

**Table CATs Indexed by Disciplines in the Brief Examples.**

<i>Discipline</i>	<i>Technique</i>	<i>CAT Number</i>	<i>Chapter Number</i>
Education	Annotated Portfolios	18	7
	Audio- and Videotaped Protocols	22	7
	Course-Related Self-Confidence Surveys	32	8
	Directed Paraphrasing	23	7
	Group-Work Evaluations	47	5
	Interest/Knowledge/Skills Checklists	34	8
	Punctuated Lectures	38	8
	What's the Principle?	20	7
Engineering	Approximate Analogies	15	7
	Background Knowledge Probe	1	7
	Pro and Con Grid	10	7
	Student-Generated Test Questions	25	7
English/Writing	Approximate Analogies	15	7
	Chain Notes	41	9
	Goal Ranking and Matching	35	8
	Group-Work Evaluations	47	9
	Pro and Con Grid	10	7
	Process Analysis	39	8
English as a Second Language	Muddiest Point	7	7
	Reading Rating Sheets	48	9
Environmental Studies	Analytic Memos	12	7
	Classroom Opinion Polls	28	8
Finance/Management	Focused Listing	2	7
Fine Arts	Annotated Portfolios	18	7
	Human Tableau or Class Modeling	26	7
Foreign Languages	Invented Dialogues	17	7
	Approximate Analogies	15	7
	Memory Matrix	5	7
	RSQC2	46	9
	Classroom Assessment Quality Circles	45	9
History	Classroom Opinion Polls	28	8
	Exam Evaluations	50	9
	Minute Paper	6	7
	Misconception/Preconception Check	3	7
	Profiles of Admirable Individuals	30	8
History of Science	Concept Maps	16	7
	Minute Paper	6	7
Journalism	Content, Form, and Function Outlines	11	7
Linguistics	Defining Features Matrix	9	7
	Documented Problem Solutions	21	7
	Approximate Analogies	15	7
Literature	Background Knowledge Probe	1	7
	Word Journal	14	7
	Everyday Ethical Dilemmas	31	8
Management	Audio- and Videotaped Protocols	22	7
	Course-Related Self-Confidence Surveys	32	8
	Documented Problem Solutions	21	5, 7
	RSQC2	46	9
Medicine	One-Sentence Summary	13	7
Music	Focused Listing	2	4
	Process Analysis	39	8
Nursing	Course-Related Self-Confidence Surveys	32	5
	Directed Paraphrasing	23	7
	Empty Outlines	4	7
	Human Tableau or Class Modeling	26	7
	Memory Matrix	5	7
	One-Sentence Summary	13	4, 7

**Table CATs Indexed by Disciplines in the Brief Examples.**

<i>Discipline</i>	<i>Technique</i>	<i>CAT Number</i>	<i>Chapter Number</i>
Philosophy	Invented Dialogues	17	7
	Pro and Con Grid	10	7
	Reading Rating Sheets	48	9
	Student-Generated Test Questions	25	7
	Word Journal	14	7
Physical Education	Course-Related Self-Confidence Surveys	32	8
	Goal Ranking and Matching	35	5
Physics	Applications Cards	24	7
	Approximate Analogies	15	7
	Focused Listing	2	7
Political Science	Applications Cards	24	7
	Content, Form, and Function Outlines	11	7
	Defining Features Matrix	9	7
	Focused Listing	2	7
	Muddiest Point	7	7
	One-Sentence Summary	13	5
	Pro and Con Grid	10	7
Psychology	Applications Cards	24	5, 7
	Chain Notes	41	9
	Defining Features Matrix	9	7
	Interest/Knowledge/Skills Checklists	34	8
	Problem Recognition Tasks	19	7
	What's the Principle	20	7
	Approximate Analogies	15	7
Public Administration	Focused Autobiographical Sketches	33	8
	Group-Work Evaluations	47	9
Social Work	Approximate Analogies	15	7
	Classroom Opinion Polls	28	8
Speech Communication	Assignment Assessments	49	9
	Focused Autobiographical Sketches	33	8
	Self-Assessment of Ways of Learning	36	5, 8
Statistics	Applications Cards	24	7
	Minute Paper	6	7
	Problem Recognition Tasks	19	7
	Productive Study-Time Logs	37	5
Study Skills/Personal Development	Everyday Ethical Dilemmas	31	8
Theology	Pro and Con Grid	10	7
Vocational and Technical Education	Annotated Portfolios	18	7
	Audio- and Videotaped Protocols	22	7
	Electronic Mail Feedback	42	9
	Goal Ranking and Matching	35	8
	One-Sentence Summary	13	7
Women's Studies	Concept Maps	16	7
	Profiles of Admirable Individuals	30	8
Zoology	Categorizing Grid	8	7

**Table CATs Indexed by Related TGI Clusters.**

	<i>TGI Cluster</i>	<i>CAT Number</i>	<i>Chapter Number</i>
<i>Cluster I</i>	<i>Higher-Order Thinking Skills</i>		
	Analytic Memos	12	7
	Annotated Portfolios	18	7
	Applications Cards	24	7
	Approximate Analogies	15	7
	Audio- and Videotaped Protocols	22	7
	Categorizing Grid	8	7
	Concept Maps	16	7
	Content, Form, and Function Outlines	11	7
	Defining Features Matrix	9	7
	Diagnostic Learning Logs	40	8
	Documented Problem Solutions	21	7
	Human Tableau or Class Modeling	26	7
	Invented Dialogues	17	7
	One-Sentence Summary	13	7
	Paper or Project Prospectus	27	7
	Pro and Con Grid	10	7
	Problem Recognition Tasks	19	7
	Process Analysis	39	8
	RSQC2	46	9
	Teacher-Designed Feedback Forms	43	9
	What's the Principle?	20	7
	Word Journal	14	7
<i>Cluster II</i>	<i>Basic Academic Success Skills</i>		
	Approximate Analogies	15	7
	Assignment Assessments	49	9
	Audio- and Videotaped Protocols	22	7
	Background Knowledge Probe	1	7
	Chain Notes	41	9
	Concept Maps	16	7
	Content, Form, and Function Outlines	11	7
	Defining Features Matrix	9	7
	Directed Paraphrasing	23	7
	Documented Problem Solutions	21	7
	Empty Outlines	4	7
	Exam Evaluations	50	9
	Focused Listing	2	7
	Memory Matrix	5	7
	Minute Paper	6	7
	Muddiest Point	7	7
	One-Sentence Summary	13	7
	Paper or Project Prospectus	27	7
	Problem Recognition Tasks	19	7
	Process Analysis	39	8
	Punctuated Lectures	38	8
	Reading Rating Sheets	48	9
	RSQC2	46	9
	Word Journal	14	7
<i>Cluster III</i>	<i>Discipline-Specific Knowledge and Skills</i>		
	Annotated Portfolios	18	7
	Applications Cards	24	7
	Audio- and Videotaped Protocols	22	7
	Background Knowledge Probe	1	7
	Categorizing Grid	8	7
	Concept Maps	16	7
	Invented Dialogues	17	7
	Documented Problem Solutions	21	7
	Electronic Mail Feedback	42	9

Table CATs Indexed by Related TGI Clusters.

	<i>TGI Cluster</i>	<i>CAT Number</i>	<i>Chapter Number</i>
	Empty Outlines	4	7
	Focused Listing	2	7
	Group Instructional Feedback Technique	44	9
	Memory Matrix	5	7
	Minute Paper	6	7
	Misconception/Preconception Check	3	7
	Muddiest Point	7	7
	Problem Recognition Tasks	19	7
	Student-Generated Test Questions	25	7
	Teacher-Designed Feedback Forms	43	9
<i>Cluster IV</i>	<i>Liberal Arts and Academic Values</i>		
	Approximate Analogies	15	7
	Chain Notes	41	9
	Double-Entry Journals	29	8
	Everyday Ethical Dilemmas	31	8
	Group Instructional Feedback Technique	44	9
	Human Tableau or Class Modeling	26	7
	Invented Dialogues	17	7
	Misconception/Preconception Check	3	7
	Pro and Con Grid	10	7
	Profiles of Admirable Individuals	30	8
	Student-Generated Test Questions	25	7
	What's the Principle?	20	7
<i>Cluster V</i>	<i>Work and Career Preparation</i>		
	Analytic Memos	12	7
	Annotated Portfolios	18	7
	Course-Related Self-Confidence Surveys	32	8
	Diagnostic Learning Logs	40	8
	Directed Paraphrasing	23	7
	Electronic Mail Feedback	42	9
	Focused Autobiographical Sketches	33	8
	Goal Ranking and Matching	35	8
	Group-Work Evaluations	47	9
	Interest/Knowledge/Skills Checklists	34	8
	One-Sentence Summary	13	7
	Productive Study-Time Logs	37	8
<i>Cluster VI</i>	<i>Personal Development</i>		
	Assignment Assessments	49	9
	Chain Notes	41	9
	Classroom Opinion Polls	28	8
	Classroom Assessment Quality Circles	45	9
	Course-Related Self-Confidence Surveys	32	8
	Double-Entry Journals	29	8
	Everyday Ethical Dilemmas	31	8
	Exam Evaluations	50	9
	Focused Autobiographical Sketches	33	8
	Goal Ranking and Matching	35	8
	Group Instructional Feedback Technique	44	9
	Group-Work Evaluations	47	9
	Interest/Knowledge/Skills Checklists	34	8
	Pro and Con Grid	10	7
	Productive Study-Time Logs	37	8
	Profiles of Admirable Individuals	30	8
	Punctuated Lectures	38	8
	Reading Rating Sheets	48	9
	RSQC2	46	9
	Self-Assessment of Ways of Learning	36	8
	Teacher-Designed Feedback Forms	43	9



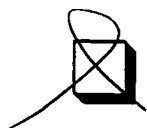


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